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ADDRESSES AND ORIGINAL ARTICLES

HE BLOOD-BRAIN BARRIER IN INFECTIOUS DIAEASES

PERMEABILITY TO TOXINS IN RELATION TO THEIR ELECTRICAL CHARGES

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1. Introduction: The Blood-brain Barrier

IN the pathogenesis of infectious diseases the ain is generally considered to be of outstanding portance. Symptoms characteristic of fevers, such apathy, insomnia, delirium, raised temperature, somotor collapse, and eventually death, are ascribed disturbances of the brain centres directly caused bacterial toxins (H. H. Meyer and Gottlieb,[1] olff-Eisner[2]). This opinion appeared to be fairly sonable as long as, according to Ehrlich, chemical inities alone were supposed to control the relations tween toxins and brain. Within the last few years, wever, investigators have become aware of the istence of a selective mechanism regulating the change of substances between blood and brain. is mechanism has been described as "barrière mato-encephalique" or "Bluthirnschranke." We pose to use the English equivalent and therefore ll speak of the blood-brain barrier or B.B.B. om all that is known about this barrier, and ecially from our previous work, it has become y doubtful whether this barrier is passed by ins. The investigation of this problem has been main object of the researches dealt with in the t part of this paper.

It should be emphasised that this problem does not ctly coincide with the question as to whether ins act on the brain, however closely both questions y be connected with one another. Tetanus in, for instance, does not pass the B.B.B., but s on the brain and the spinal cord. On the other d, non-susceptibility of the brain to toxins does necessarily imply impermeability of the B.B.B. the same toxins, because it may well be explained lack of affinity to brain cells. This discrimination y appear somewhat irrelevant from the point view of pathogenesis, but it is of great importance m its bearing on methods of investigation. Moreer, it is indispensable for the second part of the sent paper, where the ability of toxins to pass the B.B. will be dealt with in connexion with their ysico-chemical properties.

The methods available for the investigation of selective mechanism of the B.B.B. have been cribed in a series of previous papers. Their plication to the investigation of toxins and some difications especially devised for this purpose will discussed below. The experiments now described e largely confined to cobra venom and lambsentery toxin, and a few have been made on tulinus toxin. In previous papers experiments diphtheria toxin have been recorded. To arrive more general conclusions it was necessary to clude all information on the subject available from literature. As a matter of fact the problem we dealing with has hardly been ever discussed to now, and the recorded experimental data have been largely misinterpreted. They are invaluable, however, when their real significance is recognised. The explanations we shall give of them are based on our previous experiments on the B.B.B. and differ considerably from those given by previous workers on toxins. A critical re-examination of the facts already recorded from this new aspect has therefore been an essential part of our work.

2. The Methods of Investigation of the B.B.B.

At the beginning of our experimental work no methods were available for the investigation of the selective mechanism of the B.B.B. The only method largely used by clinicians was the identification in the cerebro-spinal fluid of substances previously introduced into the body. This method was, however, based on completely erroneous conceptions of the localisation of the B.B.B.

According to Goldmann[3] and Lina Stern,[4] the B.B.B. was identified with the "Blutliquorschranke," the barrier localised in the choroid plexus and in the meningeal vessels; and substances circulating in the blood were supposed to reach the brain exclusively by way of the cerebro-spinal fluid. Walter[5] has shown, however, that this theory is incompatible with modern conceptions of brain metabolism. The oxygen consumption of the brain is now known to be very high, and the material necessary for combustion cannot be supplied by a fluid almost completely destitute of foodstuffs. The crucial experiments to refute Lina Stern's theory were carried out by Wesselkin,[6] Friedemann and Elkeles,[7] and Schmid[8] independently of one another. Friedemann and Elkeles found that alizarin blue and some basic aniline dyes, when injected intravenously, stain the brain but leave the cerebro-spinal fluid entirely uncoloured.

In accordance with Walter and Spatz we have come to the conclusion that, as regards the exchange of substances between blood and tissues, the brain does not materially differ from other organs. The selective mechanism of the B.B.B. is localised in the walls of the cerebral capillaries and coincides with the permeability of these vessels.

This result is fundamental to all methods described in the present paper. According to the character of the individual toxins a variety of methods has been devised. In some cases reliable results were obtained, only by the combined application of several methods. The individual methods will be described in detail in the following sections, but some general remarks may be made here. Action on the brain may generally be taken as indicating permeability of the B.B.B., unless there is some specific evidence to the contrary, as, for instance, in the case of tetanus toxin which will be discussed later, and can be demonstrated by physiological, pharmacological, and some other methods. On the other hand, permeability of the B.B.B. to toxins can be investigated independently of their action on the brain. For this purpose, after intravenous injection of the toxin, pieces of the brain emulsified in saline are introduced into other animals. Finally, action on the brain and permeability of the B.B.B. can be tested simultaneously by applying the methods of artificial perfusion of the brain, and of the auxoneurotropic effect. The combined application of several methods is necessary in those cases in which, under ordinary experimental conditions, the toxin has been shown to have no effect on the brain. In these cases the impermeability of the B.B.B. can be demonstrated in the following ways. Either the toxin can be shown to be effective when the B.B.B. is circumvented, or the absence of the toxin from the brain after its intravenous injection

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can be demonstrated by the method described above. Only in the light of these fundamental considerations can facts recorded in the literature, as well as our own experiments, be interpreted accurately. The lack of a clear understanding of methods will be found to be responsible for the misinterpretations with which we shall meet in reassessing the significance of recorded facts. After these general remarks we now proceed to a more detailed discussion of the individual toxins.

3. Permeability of the B.B.B. to Toxins

UNIDENTIFIED TOXINS OR ENDOTOXINS CAUSING GENERAL FEVER SYMPTOMS

Bacterial toxins prepared in artificial media and studied experimentally are few in number. Yet the opinion is prevalent that symptoms common to all fevers such as raised temperatures, apathy, insomnia, delirium, and metabolic disturbances are directly caused by toxic substances of bacterial origin. Although no experimental evidence whatsoever is available to support this opinion, yet it is chiefly responsible for the general conception that toxins act on the brain. *As a matter of fact clinical observations* are very unreliable in ascertaining the cerebral origin of pathological disturbances. The brain centres regulating temperature, blood pressure, and metabolism control very complicated peripheral mechanisms, and the conception that disturbances in the functions controlled by these centres are caused by lesions of the centres themselves is largely hypothetical. Cramer,[9] for instance, pointed out that in the production of fever the thyroid gland and the suprarenals have an important part. As a rule, it is also not sufficiently realised that infection produces a series of severe changes in metabolism and in the physical condition of the body which may lead to cerebral symptoms. There are some experimental indications that raised temperature in fevers may be partially due to these secondary conditions. When fresh guinea-pig serum is incubated with dead bacteria or with agar (Bordet[10]) or starch (Nathan[11]) it acquires pyrogenic properties (Friedberger and Mita[12]). These observations strongly suggest that, under the influence of infection, pyrogenic substances are produced in the blood and in the tissues. On the other hand, there are indications that raised temperature or metabolic processes connected with it may produce cerebral symptoms characteristic of infectious fevers. We cannot but accept this explanation for the well-known fact that in typhoid fever pyramidon frequently removes all these symptons, although it certainly does not neutralise toxins.

This is all we know of these unidentified toxins. We emphasise the fact that common fever symptoms have not been proved as yet to be directly caused by the action of bacterial toxins on brain centres. No evidence whatsoever is available as regards the question whether or not these toxins pass the B.B.B.

DIPHTHERIA TOXIN

Of all toxins diphtheria toxin has been most thoroughly investigated. Meyer and Gottlieb merely express the current opinion in saying that death in diphtheria is due to poisoning of brain centres. From a clinical point of view this assertion, however, is not convincing. In diphtheria, in particular, cerebral symptoms characteristic of other febrile diseases such as apathy, insomnia, and delirium, are not observed. Fever is frequently absent in the most severe cases, and the respiratory centre is hardly ever involved.

The opinion of Meyer and Gottlieb is [illegible]er the the conception of Romberg and Pässler [illegible] death i diphtheria is due to failure of the vasomo or centre. Th conception, however, although nearl unanimousl accepted, cannot be maintained any lon er. Vasomot collapse, indeed, has been shown by MacCallum[14] to b an outstanding factor in diphtheria poisoning. But Porte and Pratt[15] found that the vasomotor centre *is not at a* impaired in experimental diphtheria, *not even in the fina* stages of the disease. To us these two facts can b explained only under the assumption that vasomoto *collapse in diphtheria is of peripheral origin* and canno be regarded as a proof for the cerebral action of diphtheri toxin.

Caporali[16] and Speransky[17] claimed to have prove by indirect methods that death in diphtheria is brough about by an action of the toxin on the brain. Caporal injected rabbits intravenously with diphtheria toxin an compared the effects of *antitoxin by the intracerebra* and the intravenous route. He found that antitoxi was more effective when given intracerebrally. Speransk stated that in rabbits the power of antitoxin is enhance by repeated withdrawal and reinjection of cerebro-spina fluid, a process by which, he claimed, an increased permeability of the choroid plexus is induced. If thes experimental results are accepted, it must be regarded a demonstrated that diphtheria toxin has a direct actio on the brain. Friedemann and Elkeles,[18] however, in large series of experiments, failed to confirm the result of Caporali and Speransky.

Another series of Caporali's experiments are ver instructive in that they show that a misinterpretation o the experimental evidence becomes inevitable when th *mechanism of the B.B.B. is ignored. Caporali claimed t* have demonstrated the importance of the brain in th pathogenesis of diphtheria by the fact that diphtheri toxin when injected intracerebrally is 10 to 20 time more effective than by the intravenous route. This fact however, although confirmed by Friedemann and Elkeles only reveals the high toxicity of diphtheria toxin to brain cells when the B.B.B. is circumvented. It does not imply that diphtheria toxin has any effect on the brain when introduced in the ordinary way. But the affinity of diphtheria toxin to brain cells demonstrated by Caporali's experiments clearly shows that the inactivity of diphtheria toxin on brain, demonstrated by Porter's and Pratt's experiments, can only be explained by the impermeability of the B.B.B. to the toxin. The correctness of thi *explanation is shown by the following experiments* which again were not interpreted in this way at the time when they were carried out.

As early as 1898 Roux and Borrel[19] have found that diphtheria toxin is almost innocuous to the rat when given by the ordinary routes. Injected intracerebrally, however, it proved to be as toxic as in the most susceptible animals. From our point of view the experiment can be explained only by the assumption that, at least in the rat, the B.B.B. is completely impermeable to diphtheria toxin.

Final proof for this conclusion can be found in the experiments of Bieling and Gottschalk,[20] who tried to identify diphtheria toxin in the various organs of animals which had received toxin intravenously. They succeeded in finding it in most organs, but they entirely failed to find it in the brain. These experiments were repeated by Friedemann and Elkeles[18] with exceedingly high amounts of toxin, and with identical results.

When all the experimental evidence is taken together it is clear that, contrary to an opinion hitherto believed to be well founded, diphtheria toxin does not act on the brain in the acute stage of the disease, because it cannot pass the B.B.B.

The opinion that diphtheria toxin is poisonous to the central nervous system was also suggested by the appearance of paralysis in the late stages of the disease. In a very careful histological study Pie ro Uhry[21] recently arrived at the conclusion that lesions are only found in the peripheral nerves. We think that this result presents a satisfactory explanation for the complete curability of post-diphtheric paralysis. In poliomyelitis, where the cells of the brain and the s hat, rd degenerate and die, permanent paralysis, is a ule, remains after the disease itself has subsided.

BOTULINUS TOXIN

Another toxin which is generally regarded as a specific toxin for the central nervous system is botulinus toxin. This opinion was even held by Forssman[22] although his experiments, in our opinion, prove exactly the reverse. While Kempner and Pollak,[23] Ossipoff,[24] and Römer and Stein[25] believe that they have found definite histological changes in the ganglion cells of the brain and of the spinal cord, Dickson and Shevky, in a very careful investigation, completely fail to confirm these results. As an outcome of their own experiments they conclude that botulinus toxin acts on the peripheral nerves. They found that in the parasympathetic nervous system the conduction of the nerve impulses is blocked by the toxin. The motor nerves were shown to have become susceptible to abnormally rapid fatigue on faradic irritation.

The most striking proof for the peripheral action of botulinus toxin, at least as we see it, was afforded by Forssman's experiments. No increased toxicity was observed when the toxin was introduced intracerebrally. Moreover, under these conditions, the toxin was easily neutralised by antitoxin given in the ordinary way. From all we know, these results are completely incompatible with the assumption that botulinus toxin has any specific affinity for brain cells. On the other hand, a special effect of the toxin on the action of the diaphragm could be demonstrated. The lethal dose was considerably reduced when the toxin was introduced into the lungs, the pleural or the peritoneal cavity, and under these conditions the diaphragm was paralysed. Antitoxin was ineffective as soon as symptoms had appeared.

Keeping in mind the lack of affinity of the toxin for brain cells, made evident by the above experiments, we could not expect an effect on the brain, even when the B.B.B. was permeable to the toxin. It was necessary, therefore, to investigate this question separately, by a method independent of the affinity of the toxin for brain cells.

With this object the following experiments were carried out.

Botulinus toxin A, which was kindly placed at our disposal by Prof. H. Schmidt, Marburg, and of which 0·00005 c.cm. injected intraperitoneally killed mice within 48 hours, was injected intravenously into mice. 0·1 c.cm. was used. After one hour the mice were killed and the toxin contents of brain and blood were compared. The results were not quite consistent. In the majority of the experiments the brain was completely free from toxin. In one experiment some toxin was found in the brain. But the amount was so insignificant, as compared with that of the blood, that we are inclined to ascribe it to the blood content of the brain. As a characteristic example the following experiment is described in detail.

A mouse of 20 g. had 0·1 c.cm. botulinus toxin A injected intravenously. The mouse was killed after one hour and the brain (400 mg.) ground in 1 c.cm. saline. 0·25 c.cm. of this emulsion injected intraperitoneally into a mouse of 20 g. was innocuous. 0·0001 c.cm. blood, also injected intraperitoneally, killed the mouse within 24 hours.

This experiment shows conclusively that the B.B.B. is impermeable to botulinus toxin.

TETANUS TOXIN

In a number of ways and by a number of investigators tetanus toxin has been conclusively proved to act upon the central nervous system, but it was early realised that tetanus toxin does not pass directly from the blood to the spinal cord; it reaches the central nervous system by way of the peripheral nerves. Two fundamental facts are the basis of this conception. First, the orderly inter-relation between the length of the incubation in the individual species and their relative size. Secondly, the beginning of symptoms in the site where the toxin has been injected. Moreover, Meyer and Ransom[27] could directly identify in the sciatic nerve the toxin previously injected subcutaneously into the hind leg of a cat. In this way they clearly demonstrated the wandering of the toxin in the peripheral nerves. Another set of ingenious experiments were carried out by Meyer and Ransom to the same purpose. They are not, however, dealt with in detail, because they have considerably lost in credit, since Horster and Whitman[28] have shown, in experiments with dyes, that toxin and antitoxin injected into the sciatic nerve apparently reach the spinal cord at once. There remains, however, sufficient evidence for the conception that the toxin reaches the spinal cord and the brain exclusively by way of the peripheral nerves. In our opinion this fact can only be explained by the assumption that the B.B.B. is completely impermeable to tetanus toxin.

THE TOXINS OF VIBRION NASIK AND VIBRION EL-TOR

In this and in the following sections a group of toxins will be considered which differ from the majority of toxins in the lack of an incubation period, and the rapidity of their action. We begin with the toxins of vibrion Nasik and vibrion El-Tor.

The mechanism of their action was carefully studied by Rothberger.[29] 3 to 5 c.cm. injected intravenously kill rabbits within two minutes. Injected in smaller doses they produce characteristic symptoms of dyspnœa. Rothberger attributes, however, no significance to these symptoms, on account of the fact that artificial respiration did not prevent or even delay death. He ascribes death to heart failure, demonstrated in the isolated heart of the cat, and feels entitled to deny any action of the toxins on the brain. In our opinion this conclusion is not warranted. The symptoms of dyspnœa observed by Rothberger seem to indicate that, in addition to heart failure, the respiratory centre is severely poisoned.

Unfortunately we have had no opportunity to apply the methods described below to the toxins of vibrion Nasik and vibrion El-Tor. The question whether they pass the B.B.B. therefore remains open, but we are rather inclined to answer it in the affirmative.

LAMB DYSENTERY TOXIN

The lamb dysentery bacillus was isolated by Gaiger and Dalling[30] in O'Brien's laboratory during an epidemic in newly born lambs. It is an anaerobic micro-organism of the perfringens group. The toxin was also discovered by Gaiger and Dalling, and a dried sample of it kindly placed at our disposal by Dr. O'Brien. It is a most powerful toxin which, injected intravenously, kills mice, guinea-pigs, and rabbits in doses of some miligrammes, and in a few minutes.

The toxins of other gas œdema bacilli resemble lamb-dysentery toxin in the rapidity of their action. The mechanism of this action was investigated by Miss Robertson[31] in the toxin of vibrion septique and by Straub[32] in the toxin of the "Gasbrand-bacillus of Ficker." Both authors demonstrated an acute action on the heart. As far as we are aware the mechanism of the action of lamb-dysentery toxin has not yet been investigated. We therefore record some interesting observations we met with in our experiments. There is a peculiar action on the heart. The auricles continue their activity after the ventricles have stopped beating. It would be interesting to find out whether this dissociation between auricles and ventricles is due to heart-block.

An action on peripheral nerves could be demonstrated in the following way. The sciatic nerves of a rabbit were exposed on both sides. On the right side the nerve was brushed with a solution of the toxin, on the left side with saline. Half an hour later a paralysis of the right leg set in and lasted for three days until death occurred. The left leg remained unaltered during the course of the experiment. The peripheral action of lamb-dysentery toxin is evident from this. Whether in addition to it the brain is involved was investigated by the following experiments.

The methods of the artificial perfusion of the brain and of the auxoneurotropic effect described below can be applied only *to toxins which exhibit an affinity* to brain cells. Before applying these complicated methods it appeared reasonable therefore to make sure that this condition was fulfilled. To this effect in a series of rabbits of 2500 g. the lethal dose of lamb-dysentery toxin was determined by the intravenous route, in another series by the intrathecal route.

TABLE I

Dose of lamb-dysentery toxin.	Rabbits which received the dose of toxin—	
	Intravenously.	Intrathecally.
100 mg. ..	+ 2 mins. after injection.	..
20 mg. ..	..	+ some hrs. after injection.
10 mg. ..	+ 5 mins. after injection.	+ some hrs. after injection.
5 mg. ..	+ 4 mins. after injection.	..
4 mg. ..	+ 5 mins. after injection.	..
2 mg. ..	+12 mins. after injection.	+ some hrs. after injection.
1 mg. ..	+27 mins. after injection.	+ some hrs. after injection.
1 mg. ..	Survived.	..
0·5 mg. ..	”	+ some hrs. after injection.
0·25 mg. ..	..	Survived.

It will be seen from these experiments (Table I.) that the lethal *dose in the intrathecal* is nearly four times lower than in the intravenous route. This result can only be explained by an affinity of lamb-dysentery toxin to brain cells. In spite of this increased toxicity the action is considerably delayed in the intrathecal route. Apparently diffusion through cerebral tissue is rather slow. Having demonstrated in this way the affinity of the toxin to brain, it was now necessary to determine whether the B.B.B. is permeable.

The method of the artificial perfusion of the brain was described by us in a previous paper.[33] It bears a close resemblance to the method of cross perfusion of the brain invented by Frédéricq[34] and Gaskell and Shore.[35] The brain of a rabbit, the receiver, is perfused by the blood of another rabbit,* the donor, by linking the carotids and jugular veins of both animals. The subclavian arteries of the receiver are ligatured near to their *origin*. Using alizarin blue as an indicator we were able to show that no perfusion at all is observed when the subclavian arteries are not ligatured. Blood clotting is prevented by the intravenous injection of heparin, generously placed at our disposal by the Schering A.G.

It is well known that in the dog the circulation of the brain cannot be completely separated from the general circulation on account of some anastomoses between the vertebral and the anterior spinal arteries.[36] But it is generally held that these anastomoses are insignificant in rabbits. This is, however, not quite true. In previous experiments we had pointed out indeed that alcohol, urethane, somnifen, and luminal natrium when injected into the femoral vein of the receiver left the brain entirely unaffected. Paraldehyde, however, under the same conditions abolished the brain reflexes of the receiver. The different action of the various narcotics is probably explained by a different action on blood-vessels, and consequently on the anastomoses between vertebral and anterior spinal arteries. Special stress is laid upon this observation, because it proved to be very helpful *in the* course of our experiments with lamb-dysentery toxin.

In the first series of experiments the toxin was injected into the brain circulation of the receiver. For this purpose some modifications of our original method were necessary. Obviously the donor would be killed, and the brain circulation immediately stopped, if the blood containing the toxin were allowed to return to the donor. The jugular veins of the receiver, therefore, were not linked with those of the donor. The blood was allowed to pour freely from the jugular veins of the receiver. To replace the loss of blood an appropriate amount of normal rabbit blood was intravenously introduced into the donor. The toxin was injected into the brain circulation of the receiver —i.e., into the carotids. Although a large series of experiments was carried out the results were unsatisfactory. In fact, the brain reflexes of the receiver (corneal, lip, tongue reflexes) disappeared *three to five minutes after* the injection of the toxin. But at the same time the brain circulation became insufficient. Apparently the blood-supply *to the* donor could not balance *long enough* the inevitable loss of blood.

In a second series of experiments the toxin was injected into the femoral vein of the receiver. The original method of perfusion was used. The peripheral action of the toxin was demonstrated clearly. The spinal reflexes disappeared, and the ventricles stopped beating. But, in the majority of experiments, the brain reflexes also disappeared three to five minutes after injection of the toxin, although the brain circulation was still excellent. Apparently the toxin reached the brain by way of the anastomoses between the vertebral and anterior spinal arteries. By these experiments the action of lamb-dysentery toxin on brain and the permeability of the B.B.B. to the toxin are clearly demonstrated.

These results are confirmed by the method of the auxoneurotropic effect. This phenomenon was described by us in a previous paper,[37] but as a method of testing the permeability of the B.B.B. it was used for the first time in these experiments. We found that the *permeability of the B.B.B. is considerably increased both by adrenaline* and pituitrin. This increase of permeability, however, is to some extent selective. It concerns exclusively those substances which normally pass the B.B.B. The efficiency of narcotic drugs and strychnine was increased to from five to ten times its normal value on account of the increased permeability of the cerebral vessels. On the contrary the latter was found not to be increased for trypan-blue, salvarsan, and cobra antitoxin, which normally do not pass the B.B.B. The demonstration of the auxoneurotropic effect therefore indicates that the substance under investigation passes the B.B.B. and acts on the brain.

Using alizarin blue S as an indicator we could clearly demonstrate that the phenomena described above must be explained by an increased permeability of the cerebral vessels. To stain the brain definitely 10 to 15 c.cm. of a 5 per cent. solution of alizarin blue S must be introduced intravenously. When 2 to 3 c.cm. of adrenaline solution 1–10,000 are given previously, 2 c.cm. of the same alizarin blue solution effect an intense staining of the brain, the lungs, and the heart. Obviously the permeability of the vascular system is increased in all those areas which do not participate in the general vasoconstriction produced by adrenaline. This suggests that the phenomenon is due, partly at any rate, to the rise in blood pressure. In the pulmonary vessels the increased permeability eventually results in lung œdema (Lusiada).[38] Pituitrin has an antagonistic effect on the pulmonary vessels. When adrenaline and pituitrin are given simultaneously, no lung œdema is observed and the lungs remain unstained. In a series of hitherto unpublished experiments we found that in this respect Hypophysine of the I.G. Farben A.G. (1 c.cm. = 3 international units) gave the best results. Pituitrin, Pitressin, and Pitocin of Parke Davis were far less effective. We have the impression that, apart from the vasopressin and the oxytocin, is a third component in the posterior lobe of the pituitary gland which specifically affects the pulmonary vessels. An action of pituitrin or hypophysine on the coronary arteries, suggested by some pharmacological observations, could not be clearly demonstrated as yet by the alizarin blue method. The cerebral vessels remain completely unaffected by pituitrin or hypophysine. The brain is even more intensely stained when hypophysine is added to adrenaline. We infer from these experiments that the combined application of adrenaline and hypophysine effects a fairly specific increase of the permeability of the cerebral vessels. In our experiments with lamb dysentery toxin 1 c.cm. hypophysine of the I.G. Farbenindustrie A.G. (1 c.cm. = 3 international units) was injected intravenously. One minute later 2–3 c.cm. adrenaline, 1–10,000, and immediately afterwards various doses of lamb-dysentery toxin were introduced, both of them intravenously.

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* The experiments on cross-perfusion were all carried out at the Rudolf Virchow Krankenhaus, Berlin.

TABLE II

Dose of lamb-dysentery toxin.	Controls = rabbits which had received no hypophysine and no adrenaline.	Rabbits which had received 1·0 c.cm. hypophysine then 0·3 mg. adrenaline.
2·0 mg. ..	+ 10 mins. after injection.	..
1·0 mg. ..	+ 19 mins. after injection.	..
0·5 mg. ..	Survived.	+ 11 mins. after injection.
0·25 mg. ..	..	+ 24 hrs. after injection.

As a result of these experiments (Table II.) we found that by hypophysine and adrenaline the toxicity of lamb-dysentery toxin is considerably increased. It amounts to four times its original value. These experiments, as well as those in which the perfusion method was used, show conclusively that the B.B.B. is permeable to lamb-dysentery toxin.

COBRA VENOM

Cobra venom was chosen as a representative of animal toxins. The venoms of the crotalus group were inappropriate for our purpose on account of their hæmorrhagic components, which were expected to change the permeability of the B.B.B. We are deeply indebted to Dr. Th. Madsen, Copenhagen, for a large sample of dried cobra venom with which the following experiments were carried out.

A very careful investigation on the mechanism of cobra venom poisoning was made by Elliot.[39] A peripheral action of cobra venom was clearly demonstrated. Constriction of the arterioles of the frog's leg was produced by perfusing it with a 1 : 10,000,000 solution of the toxin. The hearts of frogs and mammals stopped beating when perfused with 1 : 500,000 solutions. Heart failure was prevalent in animals when large doses were given; but with small doses respiratory disturbances were observed. On account of these disturbances Elliot took the cerebral effect of cobra venom for granted. According to Arthus,[40] however, the nerve-endings in the diaphragm are paralysed by cobra venom.

In our own experiments the methods described in the preceding section were used. The results of the comparative intravenous and intrathecal injections are shown in Table III.

The intrathecal is at least ten times more effective than the intravenous injection. This means that cobra venom has a strong affinity to brain cells. Here again, as in the experiments with lamb-dysentery toxin, death was considerably delayed in the experiments with intrathecal injection on account of the slow diffusion of cobra venom through brain tissues. It is noteworthy that the results of the intravenous and intrathecal methods differ far more with cobra venom than with lamb dysentery toxin. Apparently cobra venom is more toxic to brain cells than lamb-dysentery toxin.

TABLE III

Dose of cobra venom.	Rabbits which received the dose of toxin—	
	Intravenously.	Intrathecally.
10 mg. ..	+ 3 mins. after injection.	..
5 mg. ..	+ 6–9	..
2·5 mg. ..	+ some hrs. after injection.	..
1·7 mg. ..	+	..
1·0 mg. ..	Survived.	+ 25 mins. after injection.
0·4 mg. ..	..	+ some hrs. after injection.
0·3 mg. ..	..	+
0·2 mg. ..	..	+

In applying the perfusion method we met with an unexpected complication. When cobra venom was injected into the brain circulation of the receiver the brain reflexes disappeared immediately and convulsions set in. But at the same time the outflow of blood from the jugular veins of the receiver stopped at once. This phenomenon is apparently due to constriction of the brain vessels. At least this explanation is suggested by Elliot's experiments. This vasoconstriction is the reason why the perfusion experiments gave no information on the permeability of the B.B.B. to cobra venom. When cobra venom was injected into the femoral vein of the receiver the spinal reflexes disappeared at once and the heart stopped beating. The peripheral action of cobra venom could be demonstrated, which has already been shown by Elliot with other methods. The brain reflexes remained uninfluenced for 20 minutes. Lamb-dysentery toxin and cobra venom differ from one another very much in the same way as has been described above for paraldehyde and the other narcotics. Apparently the anastomoses between the vertebral and anterior spinal arteries are constricted by cobra venom.

The *auxoneurotropic* effect on cobra venom is shown in Table IV. :—

TABLE IV

Dose of cobra venom.	Controls = rabbits which had received no hypophysine and no adrenaline.	Rabbits which had received 1·0 c.cm. hypophysine and 0·3 mg. adrenaline.
2·0 mg. ..	+ 5 mins. after injection.	..
1·0 mg. ..	+ 18	..
0·5 mg. ..	+ 40	..
0·1 mg. ..	..	+ 4 mins. after injection.
0·05 mg. ..	..	+ 10

The toxicity of cobra venom is increased to as much as 20 times its normal value by hypophysine and adrenaline. The permeability of the B.B.B. to cobra venom is made clear by these experiments. The auxoneurotropic effect is much stronger with cobra venom than with lamb-dysentery toxin. Evidently cobra venom is more toxic to the brain. The experiments therefore confirm the conclusion arrived at by a comparison of the intravenous and the intrathecal routes. As a whole, our experiments as well as those of Elliot suggest that the B.B.B. is permeable to cobra toxin.

4. Summary of the Preceding Investigations

We have thus reached a point at which, from experiments of our own and from a critical review of observations gathered from the literature, it can be stated that toxins differ among themselves in the facility with which they pass the blood-brain barrier. We can say that, of the seven toxins upon which information is available, two—viz., lamb-dysentery toxin and cobra venom—pass the B.B.B. The toxins of the vibrion Nasik and vibrion El-Tor are not yet sufficiently known in this respect. There are some indications that they too pass the B.B.B. Three toxins, those of tetanus, diphtheria, and botulinus, are definitely proved not to pass the B.B.B. There is another quality according to which the toxins under investigation fall into the same groups as according to their ability to pass the B.B.B. All toxins which were shown to pass the B.B.B. are characterised by the lack of an incubation period and the rapidity of their action. The toxins which do not pass follow the rule that the incubation period of toxins is commonly a long one. In the following section we shall record new facts which strongly suggest that this coincidence is more than accidental. If this is conclusively proved, it would mean that the majority of toxins do not pass the B.B.B. We still avoid, however, a generalisation like this. We are satisfied to point to the result that two toxins—viz., diphtheria and botulinus toxin—which hitherto have almost unanimously been believed to act on the brain, in reality have no effect on it. This is a most important result with regard to the pathogenesis of infectious diseases, and we shall have to refer to it again in the discussion.

(To be concluded)

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THE TOXÆMIA OF ACUTE INTESTINAL OBSTRUCTION

THE VALUE OF B. WELCHII ANTITOXIN IN ITS TREATMENT

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It is doubtful whether any subject has attracted wider attention or resulted in more extensive investigation than has acute intestinal obstruction. The interesting and varied nature of the problem, together with the persistently high mortality resulting from the recognised lines of treatment, has provided a constant stimulus to research and a keen search for the so-called toxin of acute obstruction.

The existence of very toxic substances in the stagnant contents of obstructed loops of intestine was proved many years ago.[1] These substances when injected intravenously or intraperitoneally quickly cause death. Similar substances were shown later to be present in the contents of normal intestine,[2 3] especially after a protein meal.[4] It is well known that during normal digestion the intestinal mucosa displays a selective power in that substances of large molecular structure are not absorbed. Experiments by Wilkie [5] and others,[6 7] proving that the normal mucosa of the small intestine prevented the absorption of the products of intestinal putrefaction in appreciable quantity, dealt a severe blow to the generally accepted belief in the presence of a single lethal factor which accounted for death in all types of acute obstruction.

Hartwell and his co-workers[8] were the first to bring forward the theory that toxæmia in acute obstruction did not make its appearance in the presence of uninjured mucosa. They examined all the experimental data of Whipple and his associates and found that, in every case in which death supervened with obstruction or a closed loop, there were gross changes in the mucosa. Brooks[9] agreed with Hartwell that the toxæmia is directly proportional to the injury to the mucosa, and stated that the changes in the mucosa are caused largely by distension of the gut and the resulting embarrassment of the circulation. He added that there are two factors in the development of the toxæmia of obstruction, firstly the elaboration of the toxin, and secondly opportunities for the absorption of the toxin; and of these he believed the latter to be more important.

ELABORATION AND ABSORPTION OF THE TOXIN

The bacterial origin of the toxins in the content of obstructed bowel is now generally accepted. Those who tried to ascertain the rôle played by bacteria were faced with the almost insuperable difficulty of eliminating them entirely from segments of intestine. However, Dragstedt and his co-workers[10] isolated segments of intestine and left them open in the peritoneal cavity with all the nerves and vascular elements intact. At a later date another laparotomy was done and the loop contents found to be sterile. The ends of the loop were then inverted and the closed sterile loops returned to the abdomen. They found that animals so treated lived indefinitely, and furthermore they were able to strangulate these loops without any deleterious effect. Murphy and Brooks[11] carried out similar experiments and obtained the same results. The conclusion is that bacteria are necessary for the production of the toxin.

A toxæmia, that is to say a condition resulting from the absorption of toxic substances from the obstructed intestine, is not present in all cases of acute intestinal obstruction. It depends on the presence of a severely damaged mucosa in the obstructed segment. The importance of this factor of mucosal damage is evident in the recognition of three distinctive types of obstruction. These are :—

1. *Simple obstruction*, by which is meant an occlusion of the intestinal lumen not complicated by a circulatory disturbance of the obstructed segment of intestine.

2. *Acute strangulation*, in which the obstructing mechanism interferes grossly with the circulation of the obstructed loop, usually affecting the vessels in the mesentery.

3. *Distension necrosis*, in which the progressive distension of the obstructed segment (whether open or closed) interferes with the circulation of the intestinal wall and produces patchy gangrene of the mucosa.

In simple obstruction the excessive vomiting, which is such a marked feature of these cases, results in a progressive dehydration and sodium chloride loss with ultimate death. The most persuasive evidence that dehydration can be a directly fatal condition is the fact that death can be prevented and symptoms removed if the dehydration is adequately repaired by the subcutaneous or intravenous administration of sufficient quantities of the lost material in the form of a physiological sodium chloride solution. Gamble and his co-workers [12] state that this simple explanation is sufficiently indicated by the data at hand to make unnecessary the hypothesis of a toxin absorbed from the gastro-intestinal tract.

The other two conditions present a very different pathology. In acute strangulation, as it is seen clinically, the veins draining the loop are obstructed and the arteries remain patent, with the result that the loop becomes increasingly distended with blood until thrombosis closes the smaller arteries. Under such conditions the cause of death depends on the length of bowel involved.[13] When long loops (two feet or more) are affected, sufficient blood is withheld from the circulation by the loop to produce an acute circulatory collapse and death. Moderate-sized loops (one to two feet) are unable to hold up sufficient blood in this manner, and in these cases it has been shown that death is due to the absorption from the peritoneal cavity of the fluid exuding from the loop. This fluid is at first indistinguishable from blood plasma, but about 16 hours after the onset it begins to contain toxic substances in increasing quantity which result from the action of bacteria on the disintegrating tissues of the intestinal wall. When short loops (less than one foot) are strangulated, the process goes a step further and death is preceded by a perforation of the loop which floods the peritoneum with a toxic fluid which is also swarming with bacteria, and death results from a combination of toxæmia and peritonitis.

Distension necrosis is always the result of delay in relieving the obstruction. Most cases begin either as a simple obstruction or as an obstructed loop in which primarily there is no interference with the circulation of the obstructed intestine. As a result of delay in treatment, and aggravated by the use of purgatives and the taking of drinks, the intestine becomes progressively distended. The effect of such distension is most marked in that portion of the bowel furthest removed from its mesentery, and capillary rupture with submucous hæmorrhages results.[14] The mucosa is damaged and the contents of the intestinal lumen come into direct contact with the unprotected tissues of the intestinal wall and death may follow from the absorption of toxic substances from the lumen. But while these changes are taking place the patient is frequently vomiting and the resulting dehydration may become a serious factor. In this way distension necrosis combines the features of simple obstruction and strangulation.

Toxæmia therefore only occurs in those cases of acute obstruction where the wall has been sufficiently damaged to allow of abnormal absorption, and this factor, rather than the mere presence of the toxins in the lumen, is evidently the dominant one. The exact nature of the toxin of acute intestinal obstruction is unknown, and this adds to the experimental difficulties experienced in producing evidence of the absorption of a toxin from the obstructed intestine. In acute strangulation it has been conclusively shown that the prevention of absorption via the peritoneal cavity by enclosing the strangulated loop in a rubber bag will materially prolong the life of animals.[13] The direct evidence of the presence of a toxin in the blood of animals dying of distension necrosis is very scanty. Sugito [15] aspirated blood from the veins in the mesentery of an obstructed loop and found that the serum obtained from this blood was toxic to mice, and although Scholefield [16] corroborated these observations he emphasised the fact that the blood must be obtained during the last few moments of life to show toxicity. In consequence of the difficulty of obtaining direct evidence of the absorption of toxins from obstructed loops, the problem has been studied by indirect methods. One of the most important of these has been the study of the part played by the *Bacillus welchii* in the pathology of acute intestinal obstruction.

THE B. WELCHII THEORY

The nature of the bacteria responsible for the elaboration of the toxin did not arouse great attention until the publication in 1926 of a paper by Williams,[17] who advanced the hypothesis that the toxæmia of acute obstruction was due at least in part to the absorption of the toxin of *B. welchii* from the obstructed bowel. He noted the marked resemblance of the terminal stages of the toxæmia of gas gangrene to that of acute obstruction. He observed that *B. welchii* was by far the commonest anaerobe in the intestinal tract, and he isolated it from the vomitus and intestinal content after obstruction in a high percentage of cases of ileus. On the basis of this theory he gave *B. welchii* antitoxin to patients suffering from intestinal obstruction or peritonitis with an apparently favourable effect upon the mortality-rate. The suggestion that the toxæmia of acute intestinal obstruction is due to a known bacterial toxin aroused considerable interest, especially since the effects of the toxin suggested could be counteracted by a specific antitoxin. Numerous papers on the subject have since been published and I shall summarise them briefly.

Morton and Stabins [18] found that in dogs the development of the toxæmia following obstruction in the jejunum seemed to be delayed by the administration of the antitoxin, and the mortality was lower in an mals given the antitoxin before operative relief. Owings and McIntosh [19] concluded that the life of dogs with high intestinal obstruction was not prolonged by the use of *B. welchii* antitoxin. It is unfortunate that these experiments have dealt with high obstruction only, in which there is no evidence to show that a toxæmia ever exists. In these cases the main lethal factor is dehydration and not toxæmia, and therefore the value of *B. welchii* antitoxin cannot be decided on such experiments.

The number of workers who have studied the value of *B. welchii* antitoxin in the type of case in which toxæmia is known to exist is not very large. In 1929 McIver, White, and Lawson[20] selected for their experiments a closed loop of bowel, the veins of which were ligated, producing an acute strangulation. They gave their reasons for choosing this type of obstruction as follows. Firstly, death is known to be due to a toxæmia; secondly, death occurs before water and chloride loss can affect the issue; and thirdly, the conditions existing in a strangulated loop have been shown to be ideal for the growth of anaerobic bacteria. The experiment was therefore well planned but they were unable to show that the administration of *B. welchii* antitoxin prolonged the life of their animals. The only criticism which may be levelled at their experiments is that they were putting *B. welchii* antitoxin to the severest possible test. Perforation of a strangulated loop and flooding of the peritoneum with a highly toxic and infected fluid is the rule about 24 hours after the onset of strangulation. It is unlikely that any systemic treatment can affect the issue in such cases.

Copher, Stone, and Hildreth[21] utilised an isolated closed loop of jejunum and stated that the administration of *B. welchii* antitoxin on the day of operation prolonged the lives of their animals. Thurston[22] carried out a similar series. He stated that:

> The production of a closed loop is a questionable procedure because rupture of the loop with peritonitis is so commonly found after death, to which, of course, no immunity is possible. If the loop is found intact and no other cause for death is found, it is reasonable to assume that absorption of some of the lethal bodies within the loop has caused death. In animals with unruptured loops and without simple obstruction the administration of the specific antitoxin should have prolonged life if the absorption of that particular toxin is the cause of death.

He concluded from his experiments that the *B. welchii* antitoxin had neither a prophylactic nor a therapeutic value.

The ideal case in which to test the value of *B. welchii* antitoxin is undoubtedly an obstruction situated in the lower ileum or colon. Such cases usually terminate in the condition described as distension necrosis, and death is due to the absorption of a toxin from the obstructed segment. There is no complicating peritonitis, and if *B. welchii* toxin plays any part in the toxæmia of acute obstruction it is in this type of case that the antitoxin should prove its value. These cases present the added attraction of occurring very frequently in clinical practice. North[23] selected an obstruction of the terminal ileum for his experiments. He stated that the use of *B. welchii* both intravenously and enterally does not provide any evidence that it exerts a deterrent influence upon toxæmia or prolongs life following the production of a low intestinal obstruction closely simulating that encountered by the surgeon. He added that giving the antitoxin in a single dose at the time of operation, as he did, might not render it available at the time it was most needed. When discussing low obstruction in dogs, he stated that the changes in the blood chemistry are inconspicuous and that vomiting does not occur. He accordingly did not administer sodium chloride solutions to his animals after operation.

With these views I cannot agree. The loss of water and electrolytes by vomiting in cases of low obstruction is much less rapid than in high obstruction, but there is no doubt that, in any series of dogs with a low obstruction, a definite percentage will die as a result of dehydration and chloride loss. This percentage is increased by allowing the animals water to drink post-operatively.[24] It would appear therefore that, in order to estimate the value of *B. welchii* antitoxin in cases of low obstruction, it is essential that any possible degree of dehydration should be controlled by an adequate replacement of sodium chloride solution. The following series of experiments was carried out with that object in view.

EXPERIMENTS

Eleven dogs in all were used. An identical technique was adopted in each case. The dogs were given gr. ¼ morphine half an hour before operation, which was conducted under ether anæsthesia. The ileum was divided about six to ten inches from the cæcum and the two ends closed and invaginated. A careful asepsis was maintained throughout the operative procedure. After operation the dogs were allowed to drink water as required. Food was not given. Most of the animals vomited the day after operation and the vomiting in small amount continued until the experiment was concluded. It was noted that, after the second or third day, very little water was drunk, although it was always available. All the dogs were given intraperitoneal injections of 1 per cent. sodium chloride solution daily to counteract the dehydration which resulted from the vomiting. At first 250 c.cm. per day was regarded as sufficient but one dog died on the third day after operation from what I thought was dehydration. The dosage was accordingly increased to 750 c.cm., with marked improvement in the animals' condition. Six of the dogs were given at intervals injections of *B. welchii* antitoxin. The concentrated serum—5 units per c.cm.—was used, and each animal received a minimum dosage of 15 units per kg. of body-weight, three times the dose recommended by Williams.[17] The injections were commenced the day after operation and were continued on alternate days. Blood samples were taken at times indicated in the accompanying Table and estimations of the chloride level and non-protein nitrogen (N.P.N.) fractions made. In order to simplify the results and the subsequent comments I have tabulated the order of events as though all the operations were performed on the same day.

Estimations of Non-protein Nitrogen and Chloride in Animals, with Experimental Intestinal Obstruction

Days after operation ..		0	2	4	6	8	11	Day on which animal died.
Dog.	—							
1	N.P.N. ..	31	32	20	27	27	26	12th
	Cl ..	506	487	486	500	473	486	
2	N.P.N. ..	28	30	32	29	30	..	9th
	Cl ..	472	493	496	526	510	..	
3	N.P.N. ..	30	37	20	..	..	..	5th
	Cl ..	504	471	462	..	..	..	
4	N.P.N. ..	27	24	24	22	24	24	12th
	Cl ..	496	522	496	558	532	526	
5	N.P.N. ..	25	36	28	29	27	28	17th
	Cl ..	516	320	431	474	492	484	
6	N.P.N. ..	23	27	21	28	28	20	13th
	Cl ..	522	514	466	556	560	546	
7	N.P.N. ..	24	23	25	23	21	23	15th
	Cl ..	514	507	504	550	511	528	
8	N.P.N. ..	23	32	30	22	26	..	9th
	Cl ..	476	444	408	506	496	..	
9	N.P.N. ..	29	34	22	34	25	27	12th
	Cl ..	514	496	416	525	470	489	
10	N.P.N. ..	27	35	23	31	26	29	15th
	Cl ..	530	431	468	522	546	532	
11	N.P.N. ..	27	33	..	..	..	..	3rd
	Cl ..	452	396	..	..	..	..	

The *B. welchii* antitoxin was given by intramuscular injection to dogs 1–6 in the Table. In considering the results of this series I wish to eliminate dogs 3 and 11. The former died from a widespread peritonitis which probably followed a leakage at one of the suture lines. The latter apparently died from dehydration and sodium chloride loss. In all the remaining animals the autopsy findings were identical, differing only in the degree of distension of the obstructed intestine. The closure of the ends of the intestine was sound and there was no evidence of peritonitis. The portion of intestine immediately proximal to the obstruction was distended to several times its normal size, and the walls were very œdematous and congested. Striking changes were found in the intestinal mucosa. Numerous reddish-coloured areas were evident; the mucosa had been completely shed, and scattered submucous hæmorrhages were sometimes noticeable. These changes were most marked in the two feet of intestine proximal to the obstruction and were seldom evident beyond that distance. The liver was very small and showed marked evidence of fatty degeneration, but this was to be expected as a result of the period of starvation through which the dogs had passed.

It will be seen that the dogs receiving injections of *B. welchii* antitoxin fared no better than the untreated controls. Five dogs receiving the antitoxin lived a total of 63 days, or an average of 12·2, whilst four dogs not receiving the antitoxin lived 51 days, an average of 12·75. The results are fairly even and are not unduly affected by the result of one particular experiment. The chemical estimations on the blood samples are interesting. It appears that the administration of adequate amounts of sodium chloride solution prevents an increase in the concentration of the nitrogenous elements in the blood. Estimations made just before death show no rise in the N.P.N. fraction beyond normal limits. It is probable that the rise in the N.P.N. fraction so frequently noticed in experimental results is dependent upon impairment of renal function owing to dehydration. There is no evidence to associate a rise in the N.P.N. of the blood with the toxæmia of intestinal obstruction. From these experiments it is safe to conclude: (1) that animals with an obstruction in the terminal ileum die in spite of the prevention of dehydration and chloride loss; and (2) that life is not prolonged in these cases by the administration of large doses of *B. welchii* antitoxin.

The results of many other investigations into the problem of the toxæmia of acute intestinal obstruction are no more helpful to the *B. welchii* theory. There is ample evidence that anaerobic, sporulating, gas-forming organisms of the *B. perfringens* group are frequent inhabitants of the terminal ileum and there is no doubt that they proliferate in the lumen of the bowel after obstruction.[17 20 22] The cultural studies of the bacterial flora of obstructed loops carried out by McIver and his associates [20] deserve careful consideration. They found that there was no noteworthy increase of any organisms of the aerobic group but that the numbers of the *B. welchii* group were always increased and in no case was there any doubt that *B. welchii* was the predominant organism. They drew attention to the fact that different strains of *B. welchii* show marked variations in their ability to produce toxin, and proceeded to determine the variations in the organisms isolated from obstructed loops. Fourteen strains were used and of these eight were entirely devoid of demonstrable toxicity. Only two strains developed a toxin which compared favourably with that elaborated by a strong toxin-producing stock strain. The hæmolytic power of the *B. welchii* toxin is well known, and animals dying as a result of a lethal dose of toxin show at autopsy evidence of a definite hæmolysis with bloody fluid in the chest and abdominal cavities. But Owings and McIntosh [19] bring out in their paper the evidence that the hæmolysis that follows the intravenous injection of a lethal dose of loop toxin is very much less than that resulting from an injection of *B. welchii* toxin. They show that immunity to the *B. welchii* toxin affords no protection against an injection of the loop toxin, and point out that animals may be successfully immunised against *B. welchii* toxin. These findings have been confirmed by Thurston.[22] Dragstedt [25] was unable to demonstrate the development of any immunity in animals subjected to injections of sublethal doses of the loop toxin. Furthermore, the substance is not destroyed by boiling[26]; it is held up by a Berkefeld filter [27] and it is precipitated by five volumes of alcohol.[28] The striking similarity between the pharmacological actions of the toxic substance and those of the proteoses has been mentioned by Whipple [29] and Chittenden.[30] Thus, while there is still considerable doubt as to the exact nature of the toxic substance present in obstructed loops of intestine, the bulk of evidence is not in favour of its being a bacterial exotoxin.

CONCLUSION

B. welchii is the predominant organism present in obstructed or strangulated loops of intestine. The suggestion that the absorption from the obstructed bowel of the exotoxin of *B. welchii* is responsible for the toxæmia of acute intestinal obstruction is not borne out by later experimental work. It is important to observe that some of the earlier work which appeared to support the *B. welchii* theory was the result of experimental obstruction of a type in which toxæmia is not a lethal factor. There has now accumulated a sufficient amount of evidence from types of cases in which death is usually due to a toxæmia to suggest that the *B. welchii* toxin does not play an important rôle in acute intestinal obstruction. It is only fair to state that, on the clinical side, Williams [17] and Bower and Clark [31] have felt that improvement followed the use of *B. welchii* antitoxin in the treatment of their cases of acute obstruction. But before this opinion can be established it will be necessary to bring forward a series of carefully controlled cases with a type of intestinal obstruction in which death results from toxæmia. The mere presence of *B. welchii* in large numbers in the obstructed segment of intestine by no means proves that it is a factor of importance in producing the symptoms of the disease. Cultures of the organism from cases of acute obstruction show a large number of avirulent strains, a feature which appears to be characteristic of the strains of *B. welchii* isolated from the fæces or from wounds of the perineum and adjacent localities, where the organisms produce little or no toxin and cause no clinical symptoms of infection. But the part played by *B. welchii* in the pathology of acute intestinal obstruction cannot be summarily dismissed. Its proteolytic power is probably of great importance in the production of the toxin of acute obstruction if the view is accepted that the toxin is probably a proteose and its gas-producing power is partly responsible for the marked distension of the obstructed segment which precedes any absorption of the toxin. In this way it is probable that *B. welchii* plays an important part in the development of the toxæmia of acute obstruction. But the experimental evidence does not support the view that the exotoxin of *B. welchii* plays any part in the toxæmia of acute obstruction, and the use of the antitoxin has not proved of any value in the treatment of those types of acute obstruction in which a toxæmia is believed to exist.

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THE TREATMENT OF TETANY

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THE so-called carpo-pedal spasms characteristic of tetany consist in flexion of the metacarpo-phalangeal joints with extension of the other phalangeal joints and opposition of the thumb. The resulting position is called, for obvious reasons, "main obstétricale." Similar contractions occur in the foot and there is often simultaneous spasm of the facial muscles and chest. Severe attacks may be complicated by epileptiform cramps.

Tetany may, however, be present when no carpo-pedal spasms are seen. The existence of this "latent tetany" is indicated by—

1. *Chvostek's sign.*—Percussion of the cheek just in front of the external auditory meatus causes contraction of the facial muscles.
2. *Trousseau's sign.*—A typical carpal spasm appears when the upper arm is compressed for a minute or two.
3. *Erb's sign.*—Electrical stimulation of the nerves of the arm reveals an increased and abnormal irritability of the peripheral nervous system.
4. *Schlesinger's sign.*—A typical pedal spasm is produced by flexing the hip-joint with the knee extended, the patient being recumbent.
5. *All patients with tetany have a tendency to develop* cataract and trophic disturbances of the nails and teeth.

Manifest and latent tetany have one general cause—hypocalcæmia. When the *calcium content of the* blood-serum falls below 7 mg. per 100 c.cm. symptoms of tetany usually appear. *Hypocalcæmia can be produced by various causes but this paper deals with* two kinds only—namely, lesions of the parathyroid (*parathyroprive tetany*); and idiopathic—apparently causeless—tetany in which the function of the parathyroids is supposed to be diminished.

The prognosis of tetany has improved during the last decade, the treatment consisting in administration of calcium. Only a small part of any *calcium taken* by the mouth is absorbed from the intestine, and *intravenous injections*, though they can now be given without risk and almost always *cut short an acute* attack, have only a temporary beneficial effect. Vitamin D, when given with the calcium, improves *absorption* from the intestine. Subcutaneous injection of the active principle of the *parathyroid*, discovered by Collip in 1927 and marketed as Parathormone, causes a considerable increase in the blood calcium and will almost always counteract tetany. Only in very severe chronic cases do these three methods completely fail. Unfortunately *treatment* with parathormone is very expensive and its influence on hypocalcæmia *gradually* diminishes.

SURGICAL TREATMENT

Transplantation of parathyroid gland is usually ineffective; the transplant rarely survives, though temporary favourable results have been obtained, and the attacks of tetany generally recur after a few weeks or months. Gold[1] has recently reported one case in which parathyroid transplantation was successful.

CASE 1.—A woman was operated on for goitre in 1902. The operation was followed by a short period of tetanic symptoms, but these disappeared spontaneously and did not recur during subsequent pregnancies. Severe tetany, however, developed 13 years after the original operation. Transplants were made in 1920, 1921, and 1924, on each occasion being followed by temporary improvement. In 1930 the symptoms were serious, despite treatment by parathormone and calcium. In 1931 the attacks were accompanied by epileptiform convulsions, delirium, and dementia. Two more transplant operations were undertaken in March and April, 1931; the epileptiform cramps disappeared after the first, and the other symptoms after the second, and since then the patient has been able to go back to full work.

TABLE I

Serum calcium and inorganic phosphate in a case of parathyroprive tetany improved by transplantation of parathyroids (Gold).

	Serum Ca mg. per 100 c.cm.	Inorg. phosph. mg. per 100 c.cm.
Before transplantation	5·40	7·10
3 days after ,,	6·80	5·03
7 ,, ,, ,,	8·80	4·60
1 month ,, ,,	12·50	7·70
7 months ,, ,,	11·80	5·26
1 year ,, ,,	5·90	4·95
1½ years ,, ,,	8·20	5·70

The calcium content of the serum was less than 6 mg. per 100 c.cm. before the operation, and the inorganic phosphorus was very high: 7 mg. per 100 c.cm. instead of the normal 3·5 mg. (Table I.). After the 1931 operation the calcium became normal, and for a short time there was a slight but definite hypercalcæmia. The phosphorus reading, however, is still too high, indicating an incomplete function of the transplanted parathyroid. It is usual for the inorganic phosphorus to be high in idiopathic tetany and in tetany due to inadequate parathyroid function; there are, however, forms of tetany where both the calcium and the inorganic phosphorus are low—e.g., when fatty diarrhœa causes tetany.

In another case under my observation the transplantation of parathyroid saved the life of a patient with very severe tetany.

CASE 2.—A woman of 35 was operated on for goitre in 1915 and again for recurrence in 1924. Four days after the second operation typical tetany developed and was unaffected by very large doses of calcium lactate and parathyroid by the mouth. The attacks became more frequent and were soon accompanied by epileptiform convulsions. They were with difficulty controlled by the administration of 6 g. of chloral hydrate, and several injections of Pantopon daily. Dementia, complicated by attacks of delirium, developed, and this condition lasted for three months. At the end of that time Prof. Lanz transplanted two human parathyroids into the abdominal muscles. This operation immediately stopped the attacks, and the patient was able to go home after a period of convalescence.

Five years later she was examined again. She then felt completely well and took only calcium lactate and thyroid by the mouth. She had a severe attack of tetany in 1933 and came for examination a week later. Chvostek and Trousseau signs could not be evoked, but the calcium content of the serum was found to be 6·2 mg. per 100 c.cm. and the inorganic phosphorus 4·3 mg. The patient had previously been taking only one teaspoonful of calcium lactate; this dose was increased to two teaspoonfuls three times daily, together with two tablets of vitamin D. The symptoms disappeared completely. In September, 1933, the blood calcium was 8·07 mg. and the inorganic phosphorus 3·75.

In these two cases the benefits conferred by the transplantation of the parathyroids was lasting. Possibly in both one parathyroid gland was present but damaged, and was able to recover during the time when the transplant was being absorbed. Even so it would be remarkable that the attack should have lasted for more than three months and have become gradually worse in the presence of a damaged but recovering gland. It seems possible that the transplant may not have been absorbed, and it is at any rate certain that the operation saved the patient's life.

PARATHORMONE TREATMENT

Completely satisfactory results can also be obtained by continuous treatment with parathormone, as the following case shows.

CASE 3.—Another woman, aged 76, had typical carpopedal spasms in March, 1929, for the first time in her life. In May she had an attack of cardiac asthma and five days later a second attack of tetany. Two days later she suffered a third attack of tetany, and a week after that another attack of cardiac asthma. She was given calcium lactate, digitalis, and ouabaine by the mouth and improved somewhat, but during the succeeding summer she lost all her nails. In January, 1930, she developed cataract in both eyes and suffered from continual facial cramp when talking. Parathyroid tablets (by mouth) were started in June. In January, 1931, her condition was worse. She suffered from anorexia, stiffness in the fingers, cramps when talking, diminished eyesight, and crumbling nails. On May 6th, 1931, her blood calcium was only 4·9 mg. per 100 c.cm., although the inorganic phosphorus had not increased above 4·03 mg. (Table II.). Since then she has had 1 c.cm. of parathormone subcutaneously each day and her condition has improved from the first injection; the eyesight is better and the cramps have disappeared. After three weeks of parathormone treatment the blood calcium and phosphorus were normal and the dose was reduced to 1 c.cm. on alternate days. On June 25th she showed a slight hypercalcæmia and the dose was thereafter given every four days. After some trials a dose on alternate days was found to keep her blood calcium at the best level and this treatment has been continued up to the present. The patient feels well; she has no attacks of tetany and no heart trouble and her nails are normal. After a complicated cataract operation in 1933 she had a severe broncho-pneumonia from which she recovered.

TABLE II

Case of idiopathic tetany successfully treated with parathormone injections for 2½ years

1931.	Serum Ca mg. per 100 c.cm.	Inorg. phosph. mg. per 100 c.cm.	Parathormone.
April 30	5·02	4·02	Before treatment.
May 4	4·98	—	1 c.cm. every day.
„ 27	10·14	3·28	1 c.cm. every 2 days.
June 25	13·32	4·70	1 c.cm. every 4 days.
Oct. 9	7·93	—	„ „ „
„ 17	8·83	—	1 c.cm. every 2 days.
Dec. 22	9·49	—	„ „ „
1932.			
Oct. 23	9·40	—	„ „ „
1933.			
Dec. 11	9·51	—	„ „ „

TREATMENT BY A.T. 10

Some patients, however, cannot be kept in good health by any combination of surgical or medical methods. A new preparation has been discovered recently and has proved far more active than any of those previously used. Excessive doses of irradiated ergosterol may cause disagreeable or even dangerous symptoms which are usually accompanied by hypercalcæmia. Holtz,[2] working with Windaus in Göttingen, has made a study of the different fractions of irradiated ergosterol and has succeeded in isolating one portion which does not contain vitamin D but which has a specific influence on the calcium content of the serum. It is an oil-soluble fraction, standardised on mice, and known as A.T. 10. When taken by the mouth it causes hypercalcæmia in animals and men; the effect is less rapid than that produced by subcutaneous injection of parathormone but is more lasting. During the first few days after administration of A.T. 10 there is no considerable increase of blood calcium, but the dose should not therefore be increased, because if it is there will be accumulation and dangerous hypercalcæmia.

Holtz, in his investigations at the Charité Hospital in Berlin, has worked out the following treatment, which has proved reliable. In severe cases of tetany 5 to 10 c.cm. of A.T. 10 is given daily for three days. After this the dose must be considerably restricted, even if there is no increase in the blood calcium, lest hypercalcæmia and calcification of organs, especially the kidneys, results. Prolonged administration in correct dosage, however, is not dangerous. Holtz gave A.T. 10 to parathyroidectomised dogs for over a year and could find no symptoms of damage on autopsy.

I have tried A.T. 10 in three cases of tetany, one idiopathic and two parathyroprive. The blood calcium did not exceed 6 mg. per 100 c.cm. in any of them. I therefore began by giving 10 c.cm. of A.T. 10 on the first day and 5 c.cm. on the second and third days. Thereafter 1 to 2 c.cm. was given daily for a short time. In all the patients the calcium content of the serum increased considerably after three to five days and the symptoms of tetany disappeared. After the first ten days a dose of 1 to 2 c.cm. three times a week was usually sufficient to keep the calcium content normal. All other therapeutic measures could be stopped a day or two after the beginning of the A.T. 10 treatment.

This simple oral method of handling tetany is a great improvement on previous techniques; it can only be applied, however, in cases where the calcium content of the serum can be watched, as otherwise there is a risk of accumulation. For this reason the manufacturing firms only put A.T. 10 at the disposal of clinicians working in hospitals where calcium analyses are done regularly.

CASE RECORDS

CASE 4.—A woman, aged 42, had had thyroidectomy performed in 1924 and again in 1932. After the second operation, cramps in the hands, feet, and head had appeared, and a month later had become worse, being accompanied by epileptiform seizures. The latter disappeared under parathormone and calcium treatment and the tetany was relieved, but she still suffered from rigidity of the hands and feet and speech difficulties. Chvostek, Trousseau, and Schlesinger signs remained positive. The calcium content of the serum varied between 4 and 6 mg. per 100 c.cm (Table III.). The inorganic phosphorus of the blood was considerably increased: 5·5 to 6·2 mg. per 100 c.cm. The teeth showed caries and white patches, but the nails were normal and there were no symptoms of cataract. To attain this state of affairs the patient had to receive 80 units of parathormone subcutaneously and two 10 c.cm. doses of Calcium Sandoz intravenously, with three drops of vitamin D thrice, every day. Every attempt to reduce this intensive treatment was followed by severe attacks of tetany. Three transplantations of human parathyroid were made without result. On Sept. 25th, 1932, the calcium content of the blood was 4·8 mg. and the inorganic phosphorus 6·04.

TABLE III

Tetany after thyroidectomy. Parathormone treatment insufficient: immediate result of administration of A.T. 10

1933.	Serum Ca mg. per 100 c.cm.	Inorg. phosph. mg. per 100 c.cm.	Treatment.	
June 30	4·80	6·61	4 c.cm. parathormone (80 units) subcutaneously. 10 c.cm. calcium. Sandoz intravenously twice daily. 3 drops vitamin D, t.d.s. Aug. 14th, 22nd, and Sept. 19th: transplantation of two parathyroids.	
Aug. 5	6·20	—		
,, 14	—	—		
,, 17	6·65	5·48		
,, 19	6·44	—		
,, 22	5·86	—		
,, 22	—	—		
,, 25	5·50	—		
,, 31	5·90	—		
Sept. 5	6·20	6·05		
,, 19	—	—		
,, 25	4·80	6·04		
,, 27	—	—	10 c.cm. A.T. 10	All other treatment stopped.
,, 28	—	—	5 ,, ,,	
,, 29	—	—	5 ,, ,,	
,, 30	8·80	6·77	1 ,, ,,	
Oct. 1	—	—	1 ,, ,,	
,, 2	8·75	3·65	No ,,	
,, 3	—	—	1 c.cm. ,,	
,, 4	—	—	1 ,, ,,	
,, 5	8·94	4·37	No ,,	
,, 6	—	—	1 c.cm. ,,	
,, 7	—	—	No ,,	
,, 8	—	—	,, ,,	
,, 9	8·99	3·97	1 c.cm. A.T. 10*	
,, 16	10·95	3·86		
,, 17	—	—	No A.T. 10†	
,, 23	8·05	4·44	,, ,,	
,, 26	8·25	4·63	,, ,,	
,, 30	8·00	4·62	,, ,,	
Nov. 2	7·60	4·44	,, ,,	
,, 6	7·30	4·63	,, ,,	
,, 7	Tetany		2 c.cm. A.T. 10	
,, 8	—	—	2 ,, ,,	
,, 9	8·00	4·67	2 ,, ,,‡	
,, 13	8·65	4·27	2 ,, ,,	
,, 16	9·80	4·14	2 ,, ,,	

* 1 c.cm. A.T. 10 every second day from Oct. 9th to 17th.

† None from Oct. 17th to Nov. 7th.

‡ 2 c.cm. A.T. 10 every second day from Nov. 9th to 18th.

A.T. 10 treatment was started on Sept. 27th, 10 c.cm. being given on the first day and 5 c.cm. on the second and third days. On the fourth day the calcium content of the serum was 8·8 mg., but the phosphorus was not increased. All other methods of treatment were then stopped and the patient for the next ten days was given 1 c.cm. of A.T. 10 for two days, missing the third day. The calcium and phosphorus values then read 8·99 and 3·97 mg. per cent. respectively. From Oct. 9th to 17th 1 c.cm. was given on alternate days and the calcium and phosphorus readings were 10·95 and 3·86 mg. per 100 c.cm.

The A.T. 10 treatment was then stopped for three weeks until Nov. 7th. The blood calcium diminished to 7·3 mg. and the phosphorus went to up 4·63. On Nov. 7th the patient had a definite attack of tetany. She was therefore given A.T. 10 in daily doses of 2 c.cm. for three days and then 2 c.cm. every other day. After a week the calcium had gone up to 8·65 mg. and the phosphorus had gone down to 4·27. After ten days, normal values of both were found.

In this very severe case of parathyroprive tetany, where even large subcutaneous doses of parathormone and intravenous calcium failed to obtain a satisfactory result, A.T. 10 worked like magic. The second case shows a similarly favourable result.

CASE 5.—A woman, aged 48, was operated on for goitre in 1920 and in 1931. A month after the second operation she complained of pricking in the fingers, vertigo, headache, and fatigue, and the diagnosis of parathyroprive tetany was made in Germany in November, 1931. She received injections of a German parathyroid preparation for five months without benefit, and in April, 1932, severe cramps with general rigidity and cyanosis developed. In July she showed all the symptoms of latent tetany. She had severe hypocalcæmia and an increase of inorganic phosphates. At first she would not take parathormone injections because she thought she got sufficient relief from taking calcium and vitamin D by the mouth. In December, however, she suffered so much from general weakness and fatigue that she began taking 20 units of parathormone on alternate days, continuing to take calcium and vitamin D. On this treatment her condition was satisfactory but she always showed symptoms of latent tetany; she was always tired and her blood was hypocalcæmic (6 to 7 mg. per 100 c.cm.). Under parathormone treatment, however, the inorganic phosphorus became normal (Table IV.).

A.T. 10 treatment was started on Oct. 17th, 1933: 5 c.cm. on the first day, 10 c.cm. on the second day, 5 c.cm. on the third day, and 2 c.cm. on the fourth day. *On the fifth day the calcium in the serum had increased* from 6 mg. per 100 c.cm. to 8·4 mg. In the six succeeding *days she was given 1 c.cm. of A.T. 10 daily and thereafter* 1 c.cm. on alternate days. All other treatment was stopped when the A.T. 10 treatment was started. The calcium remained about 9 mg. per 100 c.cm., and the general condition improved rapidly. The patient felt much better and was able to resume her normal activities.

TABLE IV

Tetany after thyroidectomy, latent tetany during parathormone treatment. On oral administration of A.T. 10 the calcium of the serum increased to normal values

1932.	Serum Ca mg. per 100 c.cm.	Inorg. phosph. mg. per 100 c.cm.	Treatment.
July 19	6·72	6·30	Calcium and vitamin D by mouth.
,, 26	7·10	6·72	
Aug. 5	8·80	—	
Oct. 26	5·90	4·96	
Nov. 16	6·90	—	
Dec. 7	7·00	5·47	
1933.			
March 17	5·60	—	1 teaspoonful of calc. lact., and 15 drops vitamin D, t.d.s. Every two days: parathormone 1 c.cm. (20 units).
April 4	6·60	—	
July 7	5·70	4·41	
Sept. 28	7·25	4·73	
Oct. 12	7·20	3·59	
,, 16	6·00	3·78	
,, 17	—	—	5 c.cm. A.T. 10.
,, 18	6·10	—	10 ,, ,,
,, 19	—	—	5 ,, ,,
,, 20	—	—	2 ,, ,,
,, 21	8·40	—	1 ,, ,,*
,, 26	9·20	—	1 ,, ,,†
Nov. 8	8·70	4·34	1 ,, ,,
,, 24	9·10	—	1 ,, ,,

* 1 c.cm. A.T. 10 daily from Oct. 21st to 26th.

† 1 c.cm. A.T. 10 every second day from Oct. 26th to Nov. 24th.

CASE 6.—A man, aged 48, had a long-standing idiopathic tetany. At the age of 30 he had developed double cataract which had been operated on four years afterwards. Apart from this he had felt quite healthy until 1927, when he had complained of fatigue and cramps in the fingers, especially when overworked. In January, 1933, he had an attack of acute tetany in the street, and after that his fatigue increased so much that he could not continue working; his nails crumbled away and attacks of tetany appeared from time to time. In January, 1930, he showed severe hypocalcæmia and high phosphate content (6 to 6·5 and 5 to 6·6 mg. per 100 c.cm. respectively). Two parathyroids were transplanted with no effect at all. Parathormone injections were given between July 7th and 31st, and the serum calcium rose to 10 mg., the serum phosphate dropping to 3·36. As soon as the injections were stopped the calcium content decreased again to 6 mg. The man attended the out-patient department regularly; although he had severe hypocalcæmia all the time his only complaints were fatigue and chilliness. This is in accordance with the general experience that symptoms of chronic tetany become less marked after a lapse of time. Nevertheless, the patient was a chronic invalid unable to do regular work.

TABLE V

Latent idiopathic tetany. No influence of transplantation of two parathyroids. Transient result of parathormone injections. On oral administration of A.T. 10 the calcium of the serum increased to normal values

1930.	Serum Ca mg. per 100 c.cm.	Inorg. phosph. mg. per 100 c.cm.	Remark.
June 17	6·08	5·04	Low calcium diet.
,, 21	6·48	6·00	Mixed diet.
July 3	6·21	6·60	—
,, 4			Transplantation of parathyroids.
,, 7	6·60	5·28	—
,, 16	7·77	5·76	—
,, 21	7·52	5·52	Low calcium diet.
,, 24	6·45	—	Low calcium diet + 5 g. calc. lact.
,, 27	7·69	5·68	50 U. parathormone + 5 g. calc. lact.
,, 28	8·35	4·80	60 U. parathormone + 5 g. calc. lact.
,, 29	10·00	3·60	70 U. parathormone + 5 g. calc. lact.
,, 30	9·91	3·36	40 U. parathormone + 5 g. calc. lact.
Nov. 24	5·15	6·06	Discharged from hospital.
1931.			
Dec. 22	5·00	—	
1932.			
July 11	5·21	6·46	
1933.			
Jan. 31	5·80	6·36	Before treatment.
Oct. 14	5·42	6·40	
,, 16	—	—	10 c.cm. A.T. 10.
,, 17	—	—	5 ,, ,,
,, 18	4·80	7·10	5 ,, ,,
,, 19	—	—	2 ,, ,,
,, 20	—	—	2 ,, ,,
,, 21	7·07	6·77	1 ,, ,,
,, 23	—	—	1 ,, ,,
,, 25	9·05	4·63	1 ,, ,,
,, 27	—	—	1 ,, ,,
,, 28	9·34	5·50	—
,, 30	—	—	1 c.cm. A.T. 10
Nov. 2	—	—	1 ,, ,,
,, 6	10·10	4·45	0·5 ,, ,,
,, 10	—	—	0·5 ,, ,,
,, 14	9·13	3·97	0·5 ,, ,,
,, 18	—	—	0·5 ,, ,,
,, 22	—	—	1 ,, ,,
,, 27	8·53	4·66	1 ,, ,,
Dec. 1	—	—	1 ,, ,,
,, 5	9·80	4·95	1 ,, ,,

A.T. 10 treatment was started on Nov. 16th, 1933: 10 c.cm. on the first day and 5 c.cm. on the second and third days (Table V.). The calcium and phosphorus readings on the third day were 4·8 and 7·1 mg. per 100 c.cm. respectively, but the dose was nevertheless decreased and 2 c.cm. given for the next two days; then the calcium content was found to have risen to 7·01 mg. For a week 1 c.cm. was given every other day and the calcium and phosphorus readings were then 9·34 and 5·4 mg. respectively. The calcium remained normal and the inorganic phosphate went down to 4·5 mg. under doses of 0·5 and 1 c.cm. of A.T. 10 every few days. The patient became another man under this treatment. He had much more energy and no longer suffered from chilliness. His skin, previously extremely dry, became normal; in fact he only discovered how much he had suffered from his chronic hypocalcæmia when his blood calcium was restored to normal.

SUMMARY

(1) The transplantation of parathyroids for the treatment of tetany does not have a lasting effect although in exceptional cases it may save life. (2) For milder cases the administration of calcium and vitamin D by the mouth is often enough. (3) In most of the more severe cases improvement can be obtained by intravenous injections of calcium and subcutaneous injections of parathormone. (4) A great improvement in the methods of treatment available is represented by oral administration of A.T. 10, a by-product of the irradiation of ergosterol, small doses of which will restore the blood calcium to normal level in the severest cases of tetany, both parathyroprive and idiopathic. (5) The cumulative action of A.T. 10 must not be overlooked; after initial doses of 5 to 10 c.cm. for three days the dose must always be reduced to 1 or 2 c.cm. daily for ten or fourteen days, after which 1 to 2 c.cm. three times a week is sufficient, even in the severest cases.

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THE MECHANISM OF HOMOLOGOUS TUMOUR IMMUNITY

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IN a paper[1] on the nature of immunity to transplanted tumours, published by one of us (T. L.) in 1927, it was stated that in the case of immunity against a homologous tumour—for example, in a rat immune to Jensen's rat sarcoma (J.R.S.)—anticancer bodies were present in the immune animal's serum. This conclusion, vigorously opposed in certain quarters, was inferred from a number of experimental observations, but it could not at that time be directly demonstrated on tissue cultures of the tumour cells concerned. This difficulty has been surmounted and the presence of antimalignant-cell bodies can now be shown directly and conclusively by applying the immune rat's serum to cultures of J.R.S. cells in vitro under appropriate conditions.

The probable reason why this fundamental observation eluded previous investigators is that its vivid demonstration requires the coincidence of three separate conditions or factors, each of which, although contrary to expectation, is yet essential.

In order that the immune serum shall invariably kill the J.R.S. cells to which it is applied it is necessary that:—

1. The serum be drawn soon, preferably on the third day, after the last immunising inoculation. The titre of antibodies rises rapidly for the first 48 hours, thus

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[1] THE LANCET, 1927, i., 116.

attaining its maximum unusually early. From 48 to 96 hours it is at its highest, and it falls again equally rapidly, so that by the sixth or seventh day it may be so low as to be difficult to demonstrate.

2. The serum should be applied to young (24 hours old) actively growing J.R.S. cultures. With older cultures the reaction is much less striking.

3. The serum must be applied directly after it has been prepared, since the antibodies are exceedingly labile and may become ineffective if kept at laboratory temperature for an hour or two.

The characteristic effect of a strong serum is that it kills the J.R.S. cells within 10–30 minutes. The cells swell up, their nuclei become sharply defined and shrunken, and the fatty and protoplasmic granules agglutinate. If stained after 6–8 hours the nuclei are found to be pyknotic, while if 24 hours are allowed to elapse before staining, complete chromatolysis is seen to have taken place. Cultures of normal tissue cells are entirely undamaged by these powerful anti-cancer sera.

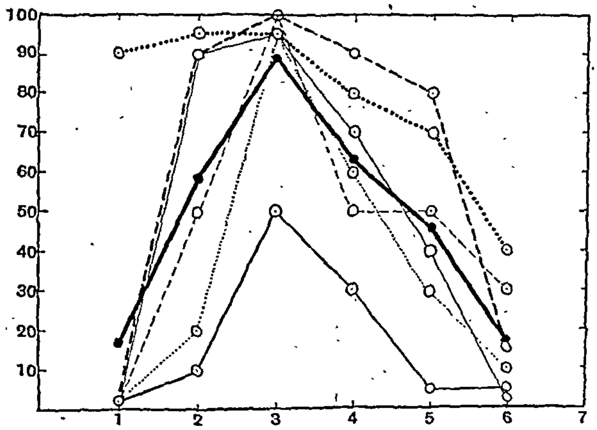

Chart showing the anti-cancer-cell potency of the sera of six rats immunised against a homologous tumour. The abscissæ show the percentage of migrating J.R.S. cells killed by the respective sera, while the ordinates represent the period at which the sera were drawn, in days, after the last injection of antigen (J.R.S.). The darkest black line is the average of all the observations; the other lines represent daily the variations in the titre of the serum of each of the six rats. All the cultures used were of comparable vigour each containing several hundreds of actively migrating sarcoma cells.

When the above precautions are taken the results are characteristic and consistent in 100 per cent. of the experiments; the sera of a rat hyper-immunised against J.R.S. kill the actively migrating J.R.S. cells, whereas control sera from normal rats similarly drawn and applied have no damaging effect at all on the J.R.S. cultures.

A full account of the methods, protocols, and evident extensions, of the experiments here referred to, will be published in the near future. It may suffice in this preliminary note to illustrate in graphic form one typical experiment showing the rise and fall of the titre of the anti-cancer bodies and their effects in a series of six rats.

We draw the following conclusions: (1) That the presence of an effective titre of anti-cancer bodies is demonstrable in the serum of an animal immunised against a homologous tumour. (2) That the existence of these antibodies provides an adequate explanation of the mechanism of homologous tumour immunity.

The experiments referred to above have been performed with the help of grants from the British Empire Cancer Campaign, which have made it possible for each of the three authors to devote his whole time to cancer research.

THE INCIDENCE OF ADENOMA OF THE PITUITARY BODY IN SOME TYPES OF NEW GROWTH

BY H. G. CLOSE, M.D. Lond.

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THE incidence of tumours in endocrine glands has recently become a matter of importance, since it is now clear that the presence of these tumours is associated in many instances with the effects of hypersecretion of their respective glands. In a series of pituitary bodies obtained from routine post-mortem examinations at Guy's Hospital in the past 18 months, not only was the incidence of tumours in the pituitary body one of the principal objects of investigation but their presence in relation to clinical signs or symptoms was also noted.

Unfortunately, it was not found practicable to examine the pituitary body in every case, and the first *200 glands* were collected from 450 consecutive cases. This group cannot, therefore, be called a true random sample, but on the other hand no deliberate choice was exercised. The selection was determined by the necessity of opening the skull—as, for example, in all cases of accident and sudden death (33); in all cases of probable cerebral involvement (40); and in many instances where a brain was required for anatomical purposes (127). In this way it was found possible to obtain a fairly representative number of both sexes (132 males, 68 females) and all ages, the average number for each decade between the ages of 10 and 70 being 30.

On removal from the sella turcica the pituitaries were fixed in 10 per cent. formol saline and cut in the horizontal plane—i.e., through the equator if the stalk were to represent the north pole. The sections were stained both with hæmatoxylin and eosin in the usual way and with a slight modification of Mallory's connective tissue stain. The use of some stain such as the latter is essential if the cells of the anterior lobe are to be classified correctly as chromophobe, acidophil, or basophil.[1]

In an investigation of this nature where all degrees of deviation from the normal appearance of the pituitary may be encountered, it is imperative that the term "adenoma" should be clearly defined. "Adenoma" is used here to describe a grouping together of one of the three types of cells found in the anterior lobe. An arbitrary limit for the diameter of an adenoma was fixed at 0·8 mm., the smallest found, but the majority of these tumours can be seen easily in the stained sections by the naked eye. The nodule of growth may be solid or partly cystic and may or may not have a fibrous boundary, but is easily distinguishable from the neighbouring cells by alterations in the arrangement, size, and shape of the cells. The normal acinose plan is lost, the stroma is often scanty, and the cells are smaller than normal. The not infrequent hyperplasia of cells confined to one acinus only has not been regarded as adenoma, and doubtful "border line" tumours have been rejected.

An examination of a few sections only from the plane through which the pituitary had been cut was made at first and revealed several points of interest. For example, in the first 200 pituitaries collected as described above, an adenoma was found in 18—i.e., the incidence of pituitary adenomata is probably at least 1 in 10. This is in agreement with the findings of other investigators.[2,3] It was also noticed that most of these adenomata were present in subjects of more than 45 years of age who had, in addition, a benign or malignant new growth in some other part of the body.

Attention was thereupon directed to testing the correctness of this latter observation: 125 pituitaries were subjected to serial sectioning, 75 from cases of proved new growth occurring elsewhere in the body, and 50 from "control" cases. The latter, the "controls," were subjects of 45 years of age or more in whom routine post-mortem examination (conducted with varying thoroughness, particularly in regard to the thyroid and sex glands) revealed to the naked eye no obvious new growth. Serial sections were cut at a thickness of 7µ and from six to twelve sections were placed on each slide, about forty slides being required for a normal-sized pituitary. Every fourth slide was stained and examined. Five of the "control" cases had an adenoma of the pituitary—an incidence of 1 in 10—and the sex, age, and post-mortem diagnosis in these cases are briefly as follows:—

1. Male, 54 years. Gastro-jejunostomy four months before dying of acute pancreatitis.
2. Male, 60 years. Gastro-jejunostomy six years before dying of acute duodenal obstruction.
3. Male, 54 years. Inguinal hernia for 20 years before it strangulated. Had a generalised hyperplasia of lymphoid tissue and a persisting thymus.
4. Male, 55 years. Died of cerebral hæmorrhage.
5. Male, 62 years. Died on admission. Thrombosis of coronary arteries of heart.

In four other cases of cerebral hæmorrhage and four other cases of sudden heart failure no adenomata were found in the pituitary.

—	Pituitaries examined.	Pituitaries with adenoma.	Incidence of adenoma of pituitary.
(A) Controls	50	5	1 in 10
(B) Adenoma of prostate ..	10	8	8 in 10
(C) Carcinoma—			
Epithelioma ..	10	0	—
Glandular ..	52	23	4·4 in 10
(a) Pancreas ..	8	6	7 in 10
(b) Rectum ..	10	6	6 in 10
(c) Bronchus ..	7	4	6 in 10
(d) Stomach ..	10	3	3 in 10
(e) Colon ..	6	2	3 in 10
(f) Prostate ..	5	1	—
(g) Breast ..	2	0	—
(h) Uterus ..	2	0	—
(i) Ovary ..	1	1	—
(j) Suprarenal..	1	0	—
(D) Sarcoma	6	2	3 in 10
(E) Lymphadenoma ..	2	1	—
Total	130	39	—

INCIDENCE OF ADENOMATA

The most striking feature of the Table is the comparatively high incidence of pituitary adenomata in cases of adenoma of the prostate and carcinomata of the pancreas, rectum, and bronchus. In the "control" cases the incidence of pituitary adenomata is only 1 in 10, so that even if the figures are too small statistically to allow definite conclusions to be drawn, they nevertheless suggest that some association exists between pituitary adenomata and certain kinds of new growth. What form this association takes is not at all clear, but four possibilities may be suggested.

First, it is well recognised that the pituitary plays some part in the growth of the body considered as a whole. Evans and others have produced gigantism in animals by injections of extract of anterior lobe [4]; and the frequent association of acidophil adenoma with acromegaly also points to a hypersecretion of the anterior lobe as the probable cause of increased stature. There is, however, no reason to believe that the pituitary can also exert this influence locally to form a new growth, though it may perhaps affect the rate of growth in one particular part, as for example in a neoplasm.

There is a striking difference in the histological appearance of a pituitary taken from a case where there is a slowly growing tumour—e.g., an epithelioma—and one taken from a case where there is a rapidly growing tumour—e.g., a sarcoma. In the epitheliomata the anterior lobe appears to be almost inactive. There are abnormally few cells in each acinus and the stroma is swollen with a "colloid"-looking substance. In the sarcomata, on the other hand, the appearance of the gland suggests a state of great activity. The acini are packed with the increased number of cells and the stroma is inconspicuous. In the cases of glandular carcinomata no correlation has yet been found between the degree of malignancy (as measured by the tendency to infiltrate and metastasise) and the presence of pituitary adenomata or cellular hyperplasia. But if the rate of growth of an active tumour in the body is increased when a pituitary adenoma is present, it would be difficult to explain the frequent association of pituitary adenomata with the less active forms of new growth, such as adenoma of the prostate.

The second suggestion to be put forward may perhaps overcome this difficulty. It is possible that the formation of a tumour in the pituitary, such as an adenoma, is only one indication of a constitutional tendency to tumour-formation in all the glands. For, as the Table shows, the incidence of pituitary adenoma is high in cases of new growth in other glands (adenoma of the prostate and glandular carcinomata), while in cases of epitheliomata not one pituitary adenoma was found. Excellent examples of cases showing widespread tendency to tumour-formation of glands have been described by Cushing and Davidoff [5] and by Simpson.[6]

Thirdly, as very little is known of the effect on the body of a chromophobe cell adenoma in the pituitary, it is possible that an undetected syndrome is associated with the pituitary adenoma present in those types of new growth which have a high incidence of pituitary adenomata as well as in the five "control" cases.

The last of the four possibilities—and the least likely—is that the presence of pituitary adenoma is accidental and unrelated to the presence of other new growths or to a syndrome common to them and to the control cases.

Carcinoma of the pancreas.—The fact that a pituitary adenoma was found in most cases of carcinoma of the pancreas is one more example of the close relationship between the pituitary and the pancreas. Among the other examples are, briefly, the changes which occur in one organ when the other is removed experimentally [7, 8]; the mutual antagonism of posterior pituitary extract and insulin [9]; the incidence of diabetes mellitus (12 per cent.) and glycosuria (25 per cent.) in acromegaly [10]; the finding of glycosuria also in cases of basophil cell adenoma of the pituitary.[11]

Adenoma of the prostate gland.—The association of chromophobe adenomata of the pituitary with adenomata of the prostate gland may also be explained on a physiological basis. One of the secretions of the anterior lobe of the pituitary is known to have a gonadotropic effect [12]; and in hypophysectomised rats, feeding with the "anterior pituitary-like substance" (Collip[13]) led to great hypertrophy of the accessory sexual organs. It should be noted, however, that most of the pituitaries in cases of carcinoma of the prostate appear to be normal histologically. Of the 10 cases of adenoma of the prostate shown in the Table, three were also cases of Paget's disease of bone, and in two of these there was a chromophobe adenoma in the pituitary.

Carcinoma of rectum.—Little can be said as to possible reasons for the fairly frequent occurrence of pituitary adenomata in this disease. But in view of what has been suggested above—namely, that the pituitary lesion might be one expression of a general glandular involvement—it may not be coincidence only that pituitary adenomata were present in 6 out of 10 cases of carcinoma of the rectum, while in approximately 7 out of 10 cases (25 out of 33 actually) of this type of carcinoma, adenomata of the rectum were present before malignant changes supervened (Dukes[14]). Thus the incidence of pituitary adenoma and of rectal adenoma in cases of carcinoma of the rectum is very nearly the same.

THE NATURE OF THE PITUITARY ADENOMATA

Of the 280 pituitaries collected, nearly half of which have so far been cut in serial sections, 39 were found to contain an adenoma. In all but two the adenoma was composed of chromophobe cells or almost entirely of chromophobe cells, for careful searching will often reveal the presence of one or two cells of other types.

There were two very small adenomata of the acidophil cells of the pituitary—one in a case of carcinoma of the rectum and the other in a case of carcinoma of the bronchus, and neither showed any of the classical signs of acromegaly, or even of gigantism.

No adenoma of the basophil cells was seen but, in a case of carcinoma of the colon in a female 69 years old, there was an adenoma-like collection of those basophil cells which are frequently seen passing back into the posterior lobe from the region of the cleft.

There were two instances of a secondary deposit in the pituitary. The malignant growth in one case was a carcinoma of the bronchus, and in the other a lymphosarcoma.

Most of the adenomata seen were too small to give rise to symptoms, and it was only possible to diagnose one of the 39 clinically. But not every large adenoma gives an indication of its presence. One adenoma, nearly double the size of a normal pituitary, had remained symptomless even though it had grown out of the pituitary fossa. Presumably, in pushing its way backwards and outwards between the posterior clinoid process and the internal carotid artery, it had met with no resistance from structures which give rise to symptoms on being disturbed.

SUMMARY

The incidence of adenoma of the pituitary gland was approximately :—

(a) 10 per cent. in all cases.
(b) 44 per cent. in cases of carcinoma of other glands.
(c) Over 50 per cent. in cases of :
  adenoma of the prostate gland ;
  carcinoma of the pancreas ;
  carcinoma of the rectum ;
  carcinoma of the bronchus.

The majority of these pituitary adenomata (38 out of 39) gave rise to no known clinical signs or symptoms.

I am grateful to Prof. G. W. Nicholson and Dr. Dorothy Russell for checking my results ; and to Dr. A. A. Osman, Dr. P. P. Laidlaw, the Medical Research Council, the Clinical Research Committee of Guy's Hospital, and particularly to an anonymous donor, for their help.

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SIMPLE FIXTURES ADAPTING A TABLE FOR CRANIAL OR SPINAL OPERATIONS

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THE fixtures here described allow a table ordinarily used for general surgery to be modified, in a simple way, for operations on the skull or spine. The advantages of these fixtures are shared by the anæsthetist and the surgeon.

THE FACE-DOWN FIXTURE

Tables used at present for spinal or cerebral operations in the face-down position usually have supports for the patient's shoulders, which project up from the top of the table itself. The patient's forehead, on the other hand, rests at a distance from the table determined by the length of his neck. If the neck is short his mouth and nose touch, or almost touch, the end of the table. This unfairly cramps the anæsthetist during the long sessions of cranial surgery and puts a sore tax upon his skill. The surgeon, for his part, is often, as I know, constrained to fit long or short patients to a fixture of average size.

The new fixture removes both difficulties. (1) It eliminates neck-length as a cramping factor by supporting the patient's shoulders at points beyond the end of the table ; his face lies then still further off, and gives the anæsthetist full access to the mouth and nose. (2) It can be easily adapted to all patients, whether small infants or the largest men.

The face-down frame (*Fig. 1*).—A rigid metal frame fits into the slots that ordinarily carry the foot-piece of the Thackray table. On each side of the frame there is a short transverse bar which can travel backwards or forwards, and each short bar carries a crutch-like shoulder-support. The six-inch gap between these bars gives clear access to the face of the patient, however short his neck, while their mobility backwards and forwards allows adjustment for every length of trunk.

The shoulder supports are fixed in height, and each can slide in or out along its short bar according to the patient's width of shoulder. The supports have *curved* stems and are reversible. At their widest, when the stems diverge, they fit the very broadest individuals ; when reversed and close together they fit the smallest child. They can at once be adjusted to any patient of intermediate width.

The head-rest.—The front of the frame carries the head-rest—a semicircular, malleable band padded with sponge rubber ; it is fixed to a stout horizontal bar that slides through a vertical one, and can thus be moved backwards, forwards, or vertically ; a thumb-screw makes it fast. The bars that carry the head-rest are long enough to permit adjustment for any length or inclination of the neck. Two sizes of head-rest have been found sufficient; both are hinged to the horizontal bar in such a way that the angle they form with it can be varied at will.

Rests for the patient's wrists keep the upper limbs alongside the trunk; the arms otherwise hang vertically.

Position of the table.—For the face-down posture the top of the table may be pumped to its maximum height of 40 inches or, if the surgeon prefers to operate with the patient's head well raised above the level of the trunk, the whole table is tilted and then brought to any height that is convenient for access. The surgeon and the assistant stand on stools.

The anæsthetist on a low seat with his back to the table has plenty of head-room beneath the frame. In front of him, below the support for the patient's head, is a shelf for bottles and instruments. Stainless steel hooks are provided to hang on the frame for the purpose of taking a sphygmomanometer dial or a tongue-forceps; a larger adjustable hook forms a convenient rest for the arm of the anæsthetist (Fig. 2).

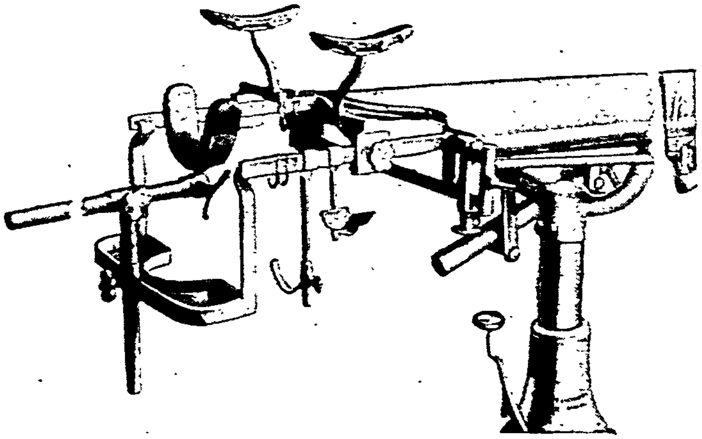

FIG. 1.—The face-down fixture, showing the frame which fits into the ordinary foot-piece slots of the table. The frame carries shoulder supports with curved stems, and a head-rest; both are adjustable to patients of every size. Note the anæsthetist's shelf and arm-rest.

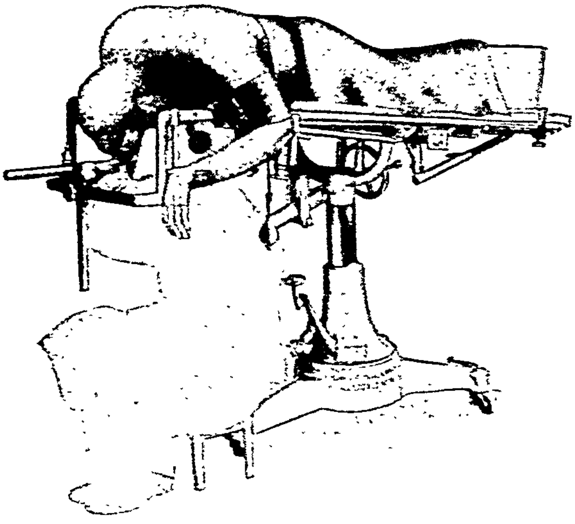

FIG. 2.—The face-down fixture in use. The anæsthetist beneath the frame has ample head-room and easy access to the patient's face. Note the wrist supports.

THE FACE-UP FIXTURE

The second fixture (Fig. 3) was designed in the first place to give free access—from beneath—to the back of the skull. Its primary purpose was to remedy a disappointing feature of the ventriculographic puncture, in which an outflow of cerebro-spinal fluid that begins well may often stop after the substitution of only a few cubic centimetres of air.

Apart from the accident of displacing the needle's point from the ventricle the cerebro-spinal outflow fails, I believe, because the needle is often introduced posteriorly when the head is lying more or less on its side; the needle does not therefore enter the bottommost part of the ventricle. Obviously, however, the only sure way of aspirating all the fluid from a closed sac and replacing it with air is to puncture the sac at the bottom, and nowhere else—a thing difficult in the cerebral ventricle without a special support for the head.

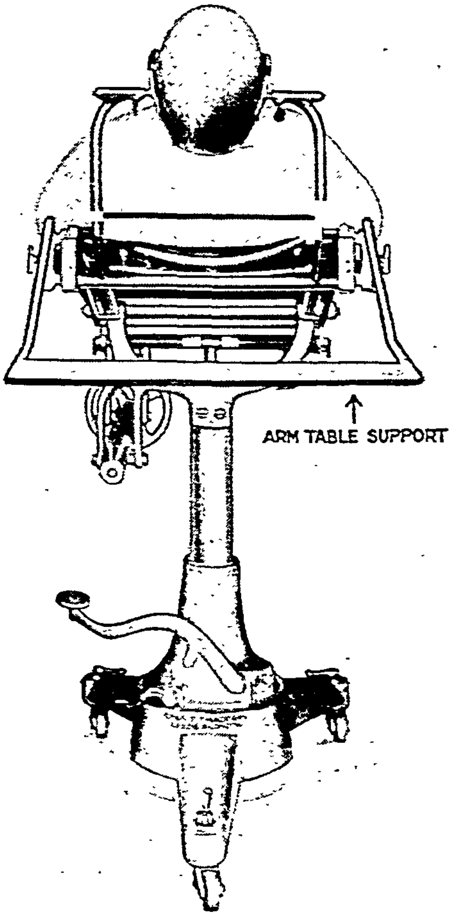

FIG. 3.—The face-up fixture arranged for ventriculographic puncture. The surgeon rests his elbows on the arm-table, which is adjustable in height. The head-supports allow free access to the neck of the skull.

Construction.—The face-up fixture consists of a frame, concave upwards, which fits, like its face-down fellow, into the foot-end of the Thackray table; it carries two narrow crescentic supports, which can be made to grasp any skull on either side, just behind the mastoid process. The surgeon, seated on a stool and working from below, has then a wide field between the crescents for tapping the ventricle at the lowest possible level. A convenient arm-table steadies and supports his elbows.

The face-up fixture is used for (*a*) frontal, and (*b*) parieto-temporal craniectomy.

(*a*) For frontal exposures the head lies face up as it does for ventriculography.

(*b*) For a wide parieto-temporal approach one crescentic support is adjusted beneath the head to the occiput; the other, set nearly at right-angles to the first, passes obliquely above and close behind the ear, supporting the parieto-occipital region on the side opposite the field of operation. The pivotal points of the two supports should be kept close together when adjusting them for this exposure.

THE PERINEAL SADDLE

Lastly, and at the suggestion of my friend Mr. Adams McConnell, a perineal support, shaped like a bicycle saddle, has been added to the table. This support, together with a pair of foot-rests, is easily slid on to the ordinary fittings of the table; it prevents all risk of the patient slipping down from the reversed Trendelenburg position required for many intracranial operations. The saddle is adjustable to patients of different length, and is also reversible for use in the face-up or face-down postures.

My best thanks are due to Messrs Thackray, of Leeds, who have made the fixtures from my design, and to their experts, Mr. Beardmore and Mr. Blackburn, for their admirable coöperation.

MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

SECTION OF MEDICINE

At a meeting of this section held on March 27th the chair was taken by Sir **Farquhar Buzzard**, the president, and a discussion was held on recent advances in the

Pathology and Treatment of Lymphadenoma

Dr. **Mervyn Gordon**, dealing with the pathology, said that lymphadenoma occupied an intermediate position between granulomata of known ætiology and malignant disease, and the problem of its causation might therefore be a key position to the problem of sarcoma. In a typical case the diagnosis could be made from sections of an enlarged gland, when the three characteristic changes were present: fibrosis, giant cells, and eosinophils. In practice, however, one or more of these three changes was often lacking. There were probably a number of different conditions, largely hitherto undifferentiated, in these atypical cases. The term "Hodgkin group" was a convenient one for the series of gradations between typical lymphadenoma and typical lymphosarcoma. The course of the disease was very suggestive of an infective agent, but the uniform fatality resembled malignant disease. So far lymphadenoma had not been certainly identified in or communicated to animals. It seemed possible that the ætiological agent would prove to be more nearly allied to that of sarcoma than of the granuloma-producing agents.

Recent work at St. Bartholomew's Hospital had included search for a pathogenic factor in lymphadenomatous glands by microscopical and other studies and work on allergic tests. No evidence had been found of spirochætal, tuberculous, or mycotic infection. Twort had found that lymphadenoma gland suspensions might cause local inflammatory nodules when injected into guinea-pigs; this had been confirmed and some very pronounced reactions noticed. In one case serial passage of this local subcutaneous granuloma had been obtained through eight guinea-pigs, the material being sterile throughout. Unfortunately this reaction could not be produced invariably.

A virus causing lymphogranuloma inguinale had been demonstrated by means of cerebral inoculation, and this procedure had therefore been used to investigate lymphadenoma. An encephalitis, frequently fatal, had been produced in the rabbit and guinea-pig, though not in the mouse or monkey, by inoculation of gland suspensions. After one to seven days susceptible animals showed symptoms such as fits, salivation, tremor, head-turning, and paresis, but the characteristic condition was one of incoördination and ataxia with muscular rigidity and spastic gait, occasionally also opisthotonus. Dr. Gordon showed slides and a film illustrating this condition. Application of this test to diagnosis showed 30 positives and 5 negatives during the last three years. Glands from other conditions gave negative results. The reaction could be obtained after heating the material for 30 minutes to 65° C. The test was of chief value in early cases; it might be negative with glands from chronic cases. The strongest reaction appeared when all the cardinal histological changes were present in the glands.

The active agent thus obtained was inactivated by keeping for half an hour at 80° C. and apparently increased when a suspension was kept by autolysis of cells. It was filtrable and withstood antiseptics well, but was gradually attenuated by ether. Moderate doses of X rays did not inactivate it. Successful passage had not been obtained, but there was evidence for the existence of both passive and active immunity, though both were very difficult to obtain. The agent was not likely to be a proteolytic enzyme. It might be complex and partly derived from the cells. An encephalitogenic agent was present in marrow and pus, but this did not invalidate the diagnostic value of the rabbit test. Bodies closely resembling the elementary bodies (Paschen) of vaccinia were found in large numbers in suspensions of lymphadenoma glands. No evidence of specific allergy had been obtained.

Dr. A. E. Gow said that the term lymphadenoma did not denote a single disease but several morbid processes which showed minor differences in clinical characteristics, course, prognosis, and therapeutic response. The histological changes were found in the reticulo-endothelial cells of lymphoid tissue, and both endothelial and reticulum cells showed overgrowth. Mononuclear elements obscured the normal structure of the gland. Endothelial cells gave rise to the typical giant cells, but in some cases mononuclear cells predominated, and there was no fibrosis and few giant cells. Considerable laboratory support was available for the theory that lymphadenoma was a virus infection, but clinically the condition did not resemble any other virus disease except oriental bubo (lymphogranuloma inguinale) and perhaps psittacosis. Specific treatment had so far proved unsuccessful. Chicken serum had been tried, and also a suspension from the patient's own glands. The latter seemed to contain some active agent, as its injection was followed by temporary relief of pruritus and swelling of the nodes in face and neck. Dr. Gow described the technique of treatment and the course in several cases, and also the attempts made to diagnose Hodgkin's disease by an intradermal allergic test. The great majority of tests had given negative results, but in three instances where the disease seemed to be "resting" a small local reaction had been seen. He also showed a number of slides illustrating the histology. There could be no doubt, he said, that life was prolonged by irradiation, and the periods of remission were increased in length, and patients were able to resume their occupation, apparently well.

A paper by Dr. W. M. Levitt was read by Dr. R. F. Phillips. The radiologist, he said, wanted to know from the physician what to treat. Further progress could only result from coöperation. A localised focus could be made to disappear, almost for certain. The doses were considerably below the tolerance limit of healthy tissues and much might be lost by attempting to use larger doses. Any increase should be in the number of areas treated. Histologically as well as clinically the lesions disappeared, but the disease was not cured. Recurrences appeared, and sooner or later became so widely disseminated in chest and abdomen that adequate doses could no longer be applied. Nevertheless palliative treatment could still be used; pressure symptoms and early cachexia could be relieved. In the final stages the disease became more resistant to X rays. Almost magical in early stages, X ray treatment might be worse than useless in the late stages. The palpable mass was not necessarily the original focus, which might really lie in deeper tissues. An initial lesion which escaped treatment would act as a centre for spread. The disease required study from the angle of distribution and march. Finzi taught that the mediastinum should be treated in every case, whatever the apparent lesion, but the abdomen presented a more difficult problem because of the effects of X rays on the organs. It was arguable that the abdomen ought to be treated as a routine measure. The chief palliative measure was the "X ray bath," an exposure of wide areas to repeated small doses. Radiologists now knew the dosage for "baths" of all areas except the trunk, where there was still some danger of leucopenia. The results of abdominal baths had so far proved only temporary.

Prof. U. Friedemann suggested that there might be two agents, one producing the encephalitis in rabbits and the other the allergic skin reaction. He had found that normal bone-marrow injected cerebrally produced the same picture, and thought more depended on the site of injection than on the material injected.

Dr. C. E. van Rooyen mentioned some of the many clinical conditions described by Hodgkin. The biological test was one of the greatest value, which had been confirmed in Edinburgh and Glasgow. A gland which contained very large numbers of leucocytes gave a persistently negative reaction and the specificity of the test seemed clear. The parasite seemed to be intracellular; the reaction was produced by something that was coming out of a cell. It might be a living agent, a toxic product, or a ferment. In the absence of inclusion bodies and animal transmission it could not be called a virus. But neither typhoid, leprosy, nor syphilis had ever been satisfactorily transmitted to animals. He thought it was a toxin. Virus infection in a cell might cause degeneration and death or proliferation; lymphadenoma was a proliferative phase.

Dr. F. Parkes Weber offered another explanation of Hodgkin's disease; he did not believe that the evidence for infection was by any means conclusive, and thought there was just as much to be said for the neoplastic theory. By neoplastic disease he meant a proliferation which served no useful or conservative purpose to the organism and for which no causative agent had been discovered. It might be benignant or malignant. The myeloses were malignant proliferation of the leucopoietic system of the body. Erythræmia was benignant proliferation of the erythroblastic system. Hodgkin's disease was, perhaps, a more or less malignant proliferation of the reticulum—a reticulomatosis. It was characteristic of neoplastic cells that they could continue their ordinary work to some extent. The reticulum was able to form all the cells found in every type of Hodgkin's disease.

MEDICAL SOCIETY OF LONDON

A meeting of this society on March 26th, with Mr. R. Davies-Colley in the chair, was devoted to a discussion on

Functional Disorders of the Bowel

Dr. T. L. Hardy (Birmingham) pointed out that many of the terms applied to colon dysfunction—such as visceroptosis, muco-membranous colitis, atonic constipation, and colon spasm—were inaccurate and needed revision, though they indicated that the neuromuscular imbalance of the bowel had a variety of phases. The tone, coördination, and harmony of the intestinal movements depended on the extrinsic autonomic nervous system; the sympathetic fibres were inhibitory to the bowel and caused contraction of the sphincters, while the parasympathetic was predominantly motor and inhibited the sphincters. Physiologists, however, held that these nervous influences were affected to some extent by the state and tone of the muscle at the time. Further knowledge of this subject could be expected not from animal experimentation but rather from operations on the sympathetic nervous system and observations on the effects of such drugs as atropine, adrenaline, and acetylcholine.

The functional disorders of the colon could be regarded as due to an imbalance between the nervous and the muscular apparatus, which resulted in disturbance in mechanical and secretory activities—a disturbance made known to the patient by symptoms such as abdominal discomfort or pain, distension, and the abnormal elimination of fæcal material. Often there was a psychical or emotional factor in addition. It was hard to estimate the frequency of these disorders, especially as the intestinal neuroses diminished in frequency with descent of the social scale. At Birmingham General Hospital, out of 1078 patients admitted on the medical side for chronic disorders of the digestive system, there were 85 of colon dysfunction (8 per cent.), but E. I. Spriggs, and Jordan, of New York, published figures giving a much higher proportion. Of 157 patients treated by the speaker 89 were females and 68 males; the greater proportion were in early middle life, 51 being aged 31–40, 29 41–50, and 27 21–30. Some of the late results of dysenteric and non-specific inflammations seemed to be due to an irritability of the neuromuscular mechanism, and were periodically made evident by attacks of diarrhœa; also chronic disease of the gall-bladder and appendix commonly caused reflex disturbances of colon function, and thus provided a good many diagnostic difficulties. Similarly an inflamed Fallopian tube or ovary might set up spasm in an adjacent coil of bowel, and influenza and upper respiratory disorders might play a part. Achlorhydria as a predisposing cause of disorders of the colon was rare, but dietetic factors were important, and some of the modern food cults did not encourage healthy action of the bowel. The colon dyspeptic reduced his total intake to relieve his indigestion, but he really aggravated it by increasing his constipation. The chief rôles in causation must be assigned to constipation and its treatment by excessive purgation, and to nervous instability. Constipation was complained of by the vast majority of patients—e.g., by 106 of his 157—77 of whom were taking irritant aperients daily. The drugs most commonly used were vegetable laxatives, such as rhubarb, aloes, cascara, and senna, and the synthetic product phenolphthalein, the last of which seemed especially harmful, since it was in part absorbed and excreted in the bile, and might go on acting over three or four days. Its continued use resulted in the passage of much mucus, and sometimes in hæmorrhoids.

Emotional upset and fatigue were common causes of functional disorder of the colon, as also were cold winds and tobacco. Abnormal mental reactions characterised many of the patients, especially tall thin people, and there was often a vicious circle of constipation, neurosis, purgation, indigestion, and undernutrition. There was no experimental evidence that chemical or bacterial toxins were absorbed from the colon in intestinal stasis in amounts sufficient to cause symptoms, and many so-called toxic symptoms were the reflex results of distension of the sigmoid and rectum with fæces. Food allergy was very real, but there was danger in too facile diagnosis of it.

Dr. Thomas Hunt said that of 93 cases of simple indigestion without organic lesion, he had been able to place 62 in the category of irritable spastic colon. Even severe cases might show little on X ray examination or by ordinary physical investigation; on the other hand, there might be big displacements with normal function. Certain symptoms aided the differential diagnosis. An increased frequency of discomfort in cold weather, and backache, were both common, as was also aching in the muscles after the passage of mucus. Flatulence was frequent and true aerophagia occurred in 11 of 53 cases; patients often said they had the feeling that defæcation was always incomplete. Frequency of micturition was another symptom, and a full bladder could excite colon spasm, thus accounting for the pain which sometimes awakened a patient at night. There might be loss of weight and vomiting, sometimes severe, and these might be aggravated by injudicious handling from the psychological point of view. Three main points of tenderness were the right iliac fossa (over the cæcum), the epigastrium (over the aorta), and the left iliac fossa (over the sigmoid).

The causes could be considered under four heads: reflex, bacterial, allergic, and nervous. The most important, he thought, were the nervous; even the effects of taking purgatives must be placed second to them. It was possible to exaggerate the importance of bacterial infection, and this had the disadvantage of fixing on patients the idea of a physical illness. Actually a sea voyage with congenial companionship (to take one example) might be far more useful than vaccines and other remedies directed towards the physical condition. Even in the cases attributed to over-use of purgatives there was a strong nervous element; this was shown by the fact that of 75 patients with other than digestive disorders, 37 had been taking purgatives every night for ten years or longer but were not adversely affected. The emotional element could sometimes be greatly reduced by reassurance, explanation, and argument, apart from any intricate psycho-analysis. The most important cause of the trouble was fear. The fear of organic disease was fairly common. At the same time there were other sources of anxiety, associated, for example, with masturbation, sexual frustration, or coitus interruptus. Lack of work and the state of mind it produced could not be ignored.

In treating the unstable colon the diet should be as free as possible, the only restrictions being the exclusion of substances with hard residue, such as nuts and peel. It was desirable to limit the formation of gas in the bowel, and a mixture of belladonna and bromide was often successful, though belladonna had less effect on colon spasm than on pyloric spasm. Sedatives lessened fear and nervous tension. In some cases he had found nitrites of value; amyl nitrite capsules almost always brought temporary relief. He had not seen much effect experimentally from either adrenaline or pilocarpine. In cases of loss of appetite and under-nourishment insulin might be useful, for a gain in body-weight would give valuable encouragement.

Dr. A. F. Hurst said it was important to realise the essential part played by mucus as a lubricant; it was absurd to look upon its presence in the stools as evidence of colitis. Secretion of mucus took place whenever the colon was irritated, and an aperient stimulated secretion in excess; but this excess should not be regarded as evidence of disease unless it was associated with looseness of bowels not caused by aperients. In normal defæcation the whole colon took part, even the cæcum, and most cases of constipation were due to deficiency in the process. Defæcation was a conditioned reflex, initiated when the child was first required to regularly use the chamber; if this reflex was for any reason broken in later life the habit should be re-formed, and this often sufficed to cure the constipation. He considered that there was only one sphincter of the colon—namely, the anal. It was the easiest of the sphincters to get at; it could be easily dilated by the fingers, and in Hirschsprung's disease frequent digital dilatation was often effective without the operation of sympathectomy. Intestinal allergy was rare but very important. Patients with this had a sudden violent colic, with diarrhœa and a feeling of unfitness; they often gave a history of asthma or hay-fever, and the blood always showed eosinophilia during the attack. Adrenaline sometimes cut short the attack. Intestinal flatulence Dr. Hurst attributed to irregularity in the small intestine.

Dr. G. E. Vilvandré spoke of the value of barium meals and barium enemas in disorders of the colon. No barium meal examination was complete, however, unless a radiogram was seen also after defæcation. If organic disease was present there might then be *contraction of the colon.*

Mr. Eardley Holland said that many women with functional disorders of the colon were thought to have gynæcological lesions. Most of the cases of this kind which he saw were the products of some emotional upset. Retroflexion of the uterus was very common indeed, and suspension of the uterus gave the patients hope. Enuresis and dyspareunia also were found in cases with colon disturbance.

Dr. **Campbell McClure** said that some people seemed to have an inborn imbalance of the vagosympathetic system. He had often found tachycardia and similar disturbances in association with colon trouble.

Mr. W. McK. **McCullagh** did not think that uterine retroversion caused intestinal disorders; but a train of symptoms, including indigestion and dyspepsia, might be caused by the pressure of the uterus on the ovaries, and he had seen women cured of indigestion by ventro-suspension.

Dr. C. E. **Newman** said that the emotional element in these cases had formerly been much neglected. When investigating functional disorders of the biliary tract it was borne in upon him how often these patients complained of disorders of the colon. Intolerance of physical cold, pain over the gallbladder region, backache, nausea without vomiting, and respiratory signs, such as sinus arrythmia, were all commonly found. It was important to give due place to vagal action in these cases.

Dr. J. E. A. **Lynham** drew attention to the great variety in colons as revealed by X rays. Patients with undescended cæcum and a rectocæcal appendix showed a peculiar picture of colon upset. They did not have periodical attacks, and they might go on without disturbance for months or years; after which there would be an attack of great pain, with distension and constipation.

Dr. **Hunt**, in reply, said he wished to make it clear that he did not conclude that colon disorder was functional until a thorough examination had been made to exclude organic disease.

EDINBURGH OBSTETRICAL SOCIETY

A meeting of this society was held on March 19th, with Dr. **Oliphant Nicholson**, the president, in the chair.

Contraction of the Uterus

Dr. **Chassar Moir** read a paper entitled Recording the Contractions of the Human Pregnant and Non-pregnant Uterus. His observations were made with three types of apparatus: (1) an intra-uterine bag and recording manometer by which contractions of the puerperal uterus could be recorded; (2) an abdominal apparatus which recorded changes in the shape of the uterus; and (3) an intra-uterine bag which could be used in the non-pregnant uterus. It was found, he said, that suckling usually caused strong contractions of the puerperal uterus to appear. Ergotoxine, ergotamine, and the alleged new alkaloid sensibamine all caused strong contractions of the uterus, but there was a delay of half an hour or more before any effect was seen after intramuscular injection. This lessened their value in post-partum hæmorrhage unless they were combined with a quick acting drug. Histamine was not effective because it had a negligible action on the uterus when it was used in doses small enough to avoid unpleasant flushing effects. Pituitary extract was reliable early in the puerperium, but its action was very erratic after the first week; in the late puerperium it often failed to produce any activity of the uterus. Liquid extract of ergot (B.P. 1914 and also B.P. 1932) had a powerful quick action on the uterus, the effect sometimes appearing in as short a time as four minutes when it was given by mouth. It caused marked spasm of the uterus for an hour or longer, its action being entirely different from that of the ergot alkaloids, and it was this quick acting factor in ergot which led to its use by midwives 200 years ago. Intra-uterine injection of glycerin was not an effective means of causing uterine contractions.

By a double uterine apparatus contractions were simultaneously recorded from fundus and cervix. There was some evidence of a peristaltic wave in the uterus, since the contractions of the cervix lagged about 17 seconds behind those of the fundus. The non-pregnant uterus showed contractions at all periods of the menstrual cycle, but these gradually increased in force from the sixteenth day till the onset of menstruation. During menstruation the contractions exerted a pressure considerably in excess of that seen during parturition. In a case of dysmenorrhœa the intra-uterine pressure rose to surprising heights. Contrary to Knaus's observations published in 1929, it was found that the uterus always responded to pituitary extract. Oxytocin (Pitocin) in doses of 10 units intramuscularly had no effect on the non-pregnant uterus, whereas vasopressin (Pitressin) in the same dose had a very marked effect.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED MARCH 24TH, 1934

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 5 (last week 10); scarlet fever, 3093; diphtheria, 1189; enteric fever, 19; acute pneumonia (primary or influenzal), 1529; puerperal fever, 70; puerperal pyrexia, 110; cerebro-spinal fever, 17; acute poliomyelitis, 5; acute polio-encephalitis, 1; encephalitis lethargica, 4; dysentery, 15; ophthalmia neonatorum, 96. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on April 1st–2nd was as follows: Small-pox, 17 under treatment, 1 under observation (last week 16 and 0 respectively); scarlet fever, 1637; diphtheria, 1803; enteric fever, 7; measles, 3557, (last week 3470); whooping-cough, 325; puerperal fever, 21 mothers (plus 7 babies); encephalitis lethargica, 260; poliomyelitis, 4; "other diseases," 160. At St. Margaret's Hospital there were 19 babies (plus 11 mothers) with ophthalmia neonatorum.

Deaths.—In 118 great towns, including London, there was no death from small-pox, 2 (1) from enteric fever, 187 (82) from measles, 14 (2) from scarlet fever, 37 (9) from whooping-cough. 54 (7) from diphtheria, 58 (23) from diarrhœa and enteritis under two years, and 109 (26) from influenza. The figures in parentheses are those for London itself.

The weekly total of fatal cases of influenza is a little lower, the figures for the last few weeks (working backwards) being as follows: 109, 115, 99, 96, 85, 87, 73. The fatal cases were widely distributed among 49 great towns, the highest number of deaths being reported from Birmingham 10, Leeds, Liverpool, and South Shields each 7, York, Stoke-on-Trent each 3.

There were 16 fatal cases of measles in Liverpool, 12 in Middlesbrough, 10 in West Ham, 4 each in Walthamstow, Salford, and Norwich. Whooping-cough caused 6 deaths in Birmingham, 3 in Liverpool. Seven deaths from diphtheria were reported from Leeds and Liverpool, 4 from West Ham and Birmingham, 3 from East Ham and Hull.

The number of stillbirths notified during the week was 282 (corresponding to a rate of 43 per 1000 total births), including 42 in London.

Lancaster Royal Infirmary.—Last year this hospital derived £1954 from the payments of 149 private patients. There were 1816 in-patients, who stayed on an average 19·14 days, as against the previous year's average of 17·28 days.

REVIEWS AND NOTICES OF BOOKS

Traité de médecine des enfants

Publié sous la direction de P. NOBÉCOURT et L. BABONNEIX. Secrétaires de la Rédaction : J. CATHALA et J. HUTINEL. Paris : Masson et Cie. 1934. Tome I. Pp. 884. Fr.170. Tome II. Pp. 960. Fr.150. Tome III. Pp. 1088. Fr.170.

IT is nearly 25 years since a system of pædiatrics in any way comparable with the present one has appeared in France. These three volumes are the first of five, and the work has been entrusted to over 70 authorities. The first volume begins with a historical review of pædiatrics and pædiatricians from the time of Hippocrates to the present day, and includes such illustrations as the obtaining of asses' milk for artificial feeding, the method of leaving and receiving infants in a foundling institution, and (a more modern touch) a royal visit in 1790 to a ward in a children's hospital. The aims and methods of prophylaxis and treatment are outlined in some detail. The main body of the volume is devoted to a consideration of normal and abnormal growth, development and nutrition, endocrine disorders, congenital abnormalities, and deficiency diseases. The disorders of growth are particularly well illustrated, though a more liberal use of normal controls in the photographs would have made the significance of these more plain. In a work of this scope, a rather fuller discussion of the recent work on the pituitary might perhaps have been usefully included, though the endocrine section otherwise gives a fair presentation of the stage that has been reached by careful clinical rather than experimental observation.

The second volume deals with infectious diseases and diseases of the blood and hæmopoietic system. We note that rheumatism is included without comment amongst the infectious diseases, although the theory of a streptococcal origin is rather summarily dismissed. Those with long memories may echo the author's opening comment : "Il serait vain et peut-être cruel de rappeler tous les germes qui ont été tour à tour décrits dans le rhumatisme articulaire aigu." "Fourth disease" receives full recognition, but (a little in the grand manner) a fifth and sixth disease as well. Congenital syphilis is, as would be expected, fully and admirably discussed, though few British clinicians will accept the attribution to it of such widespread effects ; indeed, those who boggle at inheritance as far as the third generation will be a little staggered by its calm visitation on the children of the fourth and fifth.

Diseases of the cardiovascular and respiratory systems, and the first part of the section devoted to diseases of the alimentary tract, are included in the third volume ; the numerous X ray pictures are well chosen and for the most part well reproduced, though, as is so often the case, those in which lipiodol has been used entirely fail to give adequate contrast in the print. It is perhaps a pity that in view of the value of lipiodol in the diagnosis of pulmonary disease in childhood, and the pioneer work that has been done in France in this field, more space was not devoted to a description of the technique of its injection and to the dangers and difficulties to be avoided in its use. The section on pulmonary tuberculosis in childhood gives an excellent review of the modern conception of the pathology and spread of the disease.

The volumes are beautifully produced and profusely illustrated, but in a work of such dignity more attention should have been paid to the accuracy of the references. A very great number of the English and American proper names are spelt wrongly or inconsistently (in one instance there are four mistakes in five names, and three variations of one name on one page) ; the authors of one section give naked-eye and histological post-mortem findings in a case quoted from the English literature which is, to our certain knowledge, still alive and in excellent health. The work as a whole, however, is a real addition to pædiatric literature, and the appearance of the subsequent volumes will be awaited with keen interest.

Hypnosis and Suggestibility

By CLARK L. HULL, Professor of Psychology, Institute of Human Relations, Yale. London and New York : D. Appleton-Century Company Inc. 1933. Pp. 416. 15s.

Hypnotism—Friend of Man

By J. LOUIS ORTON. London : Thorsons. 1933. Pp. 280. 5s.

Hypnosis and Suggestion

By WILL. F. LOVATT, C.S.M.M.G., B.P.A. London : Rider and Co. 1933. Pp. 144. 2s. 6d.

Hypnotism Explained

By ALAN MACEY, M.D. London : Ferland Press. 1933. Pp. 131. 2s.

HYPNOSIS is not only a therapeutic instrument for treating certain abnormal mental states ; it is still more a mental state, which provides material for investigation not only by the psychologist, but by the neurologist. To the former, it is important in the understanding of suggestion, dissociated mental states, and hysteria. To the latter, it has affinities with narcolepsy, catalepsy, and allied phenomena related to the sleep mechanism and perhaps to the epilepsies.

Dr. Clark Hull's work on hypnosis is of extreme interest as one of the very few attempts that have been made to deal with the phenomena by the controlled methods of experimental psychology. After describing concrete experiments on methods of inducing hypnosis and negative and positive states of suggestibility, he gives details of laboratory experiments which are of great value in illustrating how these illusive and much-distrusted phenomena are accessible to laboratory technique. Post-hypnotic phenomena are carefully studied, and most important is the author's denial of the identity of sleep and hypnosis. Hypnosis as heightened suggestibility is experimentally demonstrated, and such an important topic as non-prestige suggestion is analysed and related to perseveration. No psychopathologist can ignore this carefully planned inquiry.

Beside this treatise the books by Orton and by Lovatt are merely pleasant and popular expositions of hypnosis as universal panaceas. Both are well-endowed practitioners of the art, and Orton in particular writes in a friendly diffused manner which to the suggestible may have quite a hypnotic effect producing perhaps, in consequence, some uncritical enthusiasm.

Dr. Macey provides in small bulk a practical exposition of hypnosis with none of the faults exhibited by those of Orton or Lovatt. It is strictly medical and describes methods of induction and the application of hypnosis to medicine, surgery, and education. The author describes the relation of hypnosis to multiple personality, quoting Morton Prince's case. He omits, however, to discuss this case in the light of general psychopathology. This is indeed an error common in books devoted exclusively to hypnosis as an isolated phenomenon, and generally speaking provides an argument against its separate consideration.

Oxidation-reduction Potentials in Bacteriology and Biochemistry

Second edition. By L. F. HEWITT, Ph.D., B.Sc., A.I.C. Published by the London County Council. 1933. Pp. 81. 2s.

THIS valuable little monograph, the first edition of which was reviewed in our columns three years ago, was published by the London County Council as a combined description of original work carried out in their laboratories, and an introduction to the basic principles involved. The venture has had a gratifying success, which is due to the straightforward manner in which the author has dealt with his intricate subject. In this edition the text has been thoroughly revised, recent work has been included, and the bibliography has been brought up to date. Though no sensational advances are recorded, steady progress has been made. Oxidation-reduction potentials have come to stay in bacteriology and biochemistry, and this little book provides an excellent introduction to this study.

Cutaneous Neoplasms

By C. NORMAN PAUL, M.B., Ch.M., Physician for Diseases of the Skin, Sydney Hospital; Past President, N.S.W. Branch of the British Association of Dermatologists. London: H. K. Lewis and Co., Ltd. 1933. Pp. 153. 10s. 6*d*.

THE prevalence of skin carcinomata and precarcinomatous changes (keratoses on the exposed areas) in the inhabitants of Australia is well known, and has been emphasised by Dr. Paul on more than one occasion in the past. It is equally true that, per contra, lupus and tuberculous infection of the integument is rare, and there is little doubt that the power of the sun is to be blamed for the one and thanked for the other. Dr. Paul takes occasion to warn his compatriots of the dangers incurred by sun-bathing, which, superimposed on the unavoidable exposure, may turn the balance in favour of malignancy at a later date. The warning need not be taken too seriously by sun-worshippers in this country, for to be dangerous exposure must be prolonged and frequently repeated, and the chances of such cumulative effect in our climate, or even in central Europe, are small.

All the commoner tumours, except the nævi, are here considered in detail, and most of them are illustrated by excellent reproductions of photographic studies, together with photomicrographs of sections in the more important group. A section has been devoted to a brief discussion of the seborrhœic and arsenical keratosis, xeroderma pigmentosum, and some of the peculiar abnormalities of the sweat and sebaceous glands, leading to neoplastic—not necessarily malignant—changes. By far the greater portion of the book, however, is concerned with malignant disease in its various forms, the rodent ulcer—or basal-celled carcinoma (both single and the rare multiple types)—the less common squamous varieties, and X ray epitheliomata. Here Dr. Paul's opinions should be read with particular respect, for there is probably no other living dermatologist who has had so extensive an experience. One new departure in treatment will doubtless be tried; for the author claims better results with the consecutive application of radium and CO_2 in certain types of growth—the raised nodular, the ulcerative lesion with raised nodular border, and the superficial with beaded border and cicatrising centre—than with either treatment alone. The freezing precedes the radium application for two or three weeks according to the depth of infiltration, or for so long as shall render the subsequent radium application effective in one session.

It was a good idea to incorporate cutaneous neoplasms in one volume, and the lucid and unpretentious way in which the material is dealt with should make a general appeal.

Food and Character

By LOUIS BERMAN, M.D. London: Methuen and Co., Ltd. 1933. Pp. 384. 8s. 6*d*.

IT is a somewhat humbling reflection that the human belief in magic is such that the last 500 years have simply served to substitute vitamins for mandrakes and gland extracts for love philtres. The title Dr. Berman gives to his first chapter—"Body-mind as a Chemical Brew"—is a good example of the fare his book provides, whilst an introductory cocktail is extracted from the dicta of Henry Ford, Senator Copeland, and others. As there are always a great many people who like to think their food fads are based on the profoundest scientific reasoning (and indeed Dr. Berman handles words like "purins" and "calcium balance" as a master), this book will doubtless appeal to a large public and have an extensive circulation.

A Text-book of Physiology

For Medical Students and Physicians. Twelfth edition, thoroughly revised. By WILLIAM H. HOWELL, Ph.D., M.D., Sc.D., Emeritus Professor of Physiology in the Johns Hopkins University, Baltimore. London and Philadelphia: W. B. Saunders Co., Ltd. 1933. Pp. 1132. 32s. 6*d*.

IN the preface to this book is to be found the sentence "It is doubtless the art of presentation that makes a text-book successful or unsuccessful." Dr. Howell is a master of this art as well as of his subject, and the latest edition of his work is no less attractive than its predecessors. The subject matter is presented in a straightforward way, with great ease of expression; yet no explanation is shirked which is necessary for its proper understanding. The book is not suitable for the advanced student or the research worker, since the author has himself sifted the available facts and theories and has aimed at placing a clear statement before the reader; it is, however, ideal for the student beginning his study of physiology and for anyone who desires a coherent framework on which to build future knowledge, be it on advanced physiology or on medicine. A generous sprinkling of footnote references furnishes jumping-off points for more detailed study if this is desired. The number of pages gives a rather misleading idea of the size of the book, since the print is large and the margins spacious; these features make for ease in reading, however, and the publishers deserve credit for an attractive production.

The arrangement of material is unlike that usually found in English text-books, the central nervous system and special senses being treated in early sections; the former is well done, but is still dominated by the anatomical tradition. That the interests of the student are given first place is emphasised in the section on blood, where the subject of coagulation is dealt with lucidly; the author's own theories are not stressed at the expense of others. Digestion comes rather late in the book, and is described with a minimum of chemistry; much that often precedes digestion is discussed later in relation to kidney excretion, nutrition, and heat production, while the classification of proteins and a certain amount of physical chemistry are relegated to the appendix. This method has advantages from the point of view of interest and perspective, but the student who is a little weak in his preliminary sciences would probably appreciate an enlargement of the appendix to include at least the chemistry of carbohydrates and fats. A reference section of this sort would be extremely valuable, even at the risk of repetition, and would justify the fundamentally sound arrangement which has been adopted. Throughout the book, wherever there is danger of confusion of issues, a historical survey has been inserted, which makes clear at least the evolution of the subject. For the most part the illustrations have been carefully chosen, so that each has an unmistakable significance; they include a few very good colour plates.

Over den Oorsprong der Syphilis

By W. F. R. ESSED. Amsterdam: H. J. Paris. 1933. Pp. 328.

THE title of this book is somewhat misleading, for only a very small fraction of its space is devoted to the origin of syphilis. The author holds that the disease "has always been known in Europe." The evidence for this statement is not given in detail, but is summarised in the sentence: "The recognition by various ancient writers of condylomata lata as an infective lesion of the genitalia and anus, Hippocrates' description of the combination of perforated palate and saddle-nose, and the existence of pre-Columbian bones showing gummatous osteomyelitis are facts which cannot be explained away." The general consensus of informed opinion at the present day is opposed to the pre-Columbian existence of syphilis in Europe. The evidence on the other side has been well summarised by W. A. Pusey in his book "The History and Epidemiology of Syphilis," recently reviewed in these columns.

The bulk of the book consists in an attempt to show that the "new sickness" which was brought into Europe by Columbus' seamen on their return from Haiti in 1493, which within the next few years devastated Western Europe and to which Fracastor in 1530 gave the name of syphilis, was in fact not syphilis at all but frambœsia. The author lays stress on the clinical resemblances between the new sickness, or morbus gallicus, and yaws; on the similarity of the native names for yaws, in different parts of the world at the present day, to the names given to the "new sickness"; and on the differences between the latter and syphilis as now seen. The most interesting part of the book is the full description, compiled from contemporary sources, of the clinical characters of the "new sickness." The book would be improved by the addition of an index and by the arrangement of the extensive bibliography on some systematic plan.

HEALTH OF THE NAVY IN 1932

THE year was a healthy one in the Navy[1]; new cases of illness and daily sick were both less than in previous years. Accident was the chief cause of death, and the rate was substantially raised by the loss of 57 lives in Submarine M2; allowing for this, the death-rate of Army and Navy is almost identical—viz., 2·53. Fatal injuries (apart from the M2 disaster) numbered 66, suicide 14. From disease the death-rate was 1·57 per 1000, the chief contributants being pneumonia 18, pulmonary tubercle 12, malignant new growths 10. On the other hand losses by invaliding were greater by 112; pulmonary tubercle 194 (30 plus), sequelæ of gonorrhœa 32 (22 plus), "other nervous diseases" 73 (30 plus), mental instability 38 (21 plus). One of the 12 cases of enteric fever ended fatally; it is not quite clear from the report when preventive inoculation was given.

Malaria has slightly decreased; the majority of new cases were benign tertian, but in Africa only malignant tertian were seen. Prophylaxis by quinine is touched on: the men of *Delphinium* all took quinine and none got malaria, but the report gives no clue to the degree of exposure. Influenza was light; cases chiefly occurred at home. There were 6 deaths among 43 cases of meningococcal infection; deaths were halved though cases had increased. Some credit for this result is given to frequent lumbar puncture combined with glucose per rectum and much liquid by the mouth. Intrathecal injection of serum was continued until the cerebro-spinal fluid became clear, serum being also given intravenously (up to 40 c.cm. daily) if there was a rash. The incidence of pulmonary tuberculosis has increased from 2·05 to 2·47 per 1000, the highest rates being found on destroyer and submarine depôt ships, but the numbers are too small to draw deductions. It is however noteworthy that the incidence of tubercle in the Navy is double that in the Army or the Air Force at almost every age, a fact worthy of study by the Joint Medical Services Committee which is now in being. Undulant fever is raising its head again at Malta. Venereal diseases are no worse—syphilis slightly up, gonorrhœa slightly down—but, as we have seen, rather more invaliding for sequelæ of gonorrhœa. The prevalence of tonsillitis in Army and Navy is almost equal, but catarrh is almost three times as frequent as in the Navy. Scarlet fever in *St. Vincent* has been again halved by Dick testing and active immunisation. Of diphtheria there were 18 cases in Greenwich Hospital School, only four of which were clinically recognisable. Among the other diseases caused by infection were a fatal case of anthrax meningitis in England, and one of glanders in a Somali from the Red Sea.

Two cases of gastric ulcer, operated upon on the fifth and sixth days, made good recoveries without drainage. Antigonococcus vaccine was used with good results in chronic cases and in others with metastatic sequelæ. An artificer apprentice was found with dextrocardia, but in perfect health. An infra-red generator has been installed at Chatham, and has been usefully employed in obtaining deep hyperæmia. Eight cases of acute appendicitis and one of perforated duodenal ulcer were operated on successfully in ships at sea. Only eight men were invalided refusing operation, showing an increasing confidence of the service in its medical staff.

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[1] Statistical Report of the Health of the Navy for 1932. H.M. Stationery Office. Pp. 144. 2s. 6d.

THE LANCET

LONDON: SATURDAY, APRIL 7, 1934

INCREASING CARE OF THE BLIND

THE Ministry of Health has done well to publish a revised edition of the handbook on the welfare of the blind compiled by its advisory committee.[1] The book is based on the definition of blindness adopted for the purposes of the Blind Persons Act of 1920; it deals with the register of blind persons which every county and borough council in England and Wales is under the obligation of keeping, and with the methods of certification for the purposes of these registers. It sets out the welfare services that have been established for the employable blind by way of training and augmentation of wages earned when trained; and for the unemployable blind, unfortunately in the majority, by means of Braille teaching and home visiting, including the measures to be taken to prevent any blind person from falling into destitution. A growing number of authorities are laying down a scale up to which the income of each unemployable blind person should be brought, and have voted substantial sums to assist the funds of voluntary agencies in meeting these payments. The first difficulty that arises in implementing this measure is on the definition of blindness. There are still two statutory definitions. One, for purposes of the Education Act, runs: "Too blind to be able to read the ordinary school books used by children"; the other, for purposes of registration and eligibility for certain privileges, including the old-age pension at 50, runs: "So blind as to be unable to perform any work for which eyesight is essential." In interpreting the latter definition certain rules have been laid down by the Ministry of Health for the guidance of the certifying surgeon. The main difficulty is to decide whether or not a person having visual acuity between 3/60 and 6/60, with full or nearly full fields of vision, is or is not blind within the meaning of the Act. There are a considerable number of these borderland cases, and some latitude is necessarily given to the certifying surgeon, certain points being laid down for his guidance. Cases with visual acuity between 3/60 and 6/60 should, if there is no material contraction of the field, not as a rule be certified as blind. If however there is a material restriction of the field they should. Does this mean that when one eye is blind or excised and the other sees, say, 5/60 with full field the case should not be certified? Here there is necessarily a restriction of the binocular field of vision, and probably many cases of this type are certified. The certifying surgeon is also told that he can take into account the age at which the defect of sight was first noticed and the age of the patient. Young persons can adapt themselves more readily than old to new conditions, and a man whose defect is recent is less likely to be able to adapt himself to any sighted work than one whose defect is of long standing. The problem of the partially sighted, such as some of those indicated above, does not come within the scope of this handbook, but until there is some consensus of opinion as to what should be done with them and how to help them there will always be the tendency to deal leniently with them in certification. This specially applies to those partially blind persons who, having been educated at a blind school and received a vocational training fitting them to earn their own living partially as subsidised workers under the Blind Persons Act, would yet be quite unable to support themselves without such aid.

All the 146 councils of counties and county boroughs in England and Wales have now made schemes under the Act. The first matter for which these schemes make provision is registration. At present this must be very incomplete. For instance, in 1932 the number of registered blind persons was 59,788. Of these the number under 5 years old was only 225, whereas the number between 5 and 16 was 2066. Now blindness which first becomes manifest during school age is rare, and it is probable that the great majority of the 2000 registered during school age were cases of blindness either congenital or occurring during infancy. It is true that blindness due to ophthalmia neonatorum, which used to be the most important cause in infancy, has very markedly diminished, but this is not the case with blindness due to various congenital malformations, such as congenital cataract, which form a large proportion of the whole. The fact probably is that the majority of cases of infantile blindness do not come to the notice of public authorities until they are of school age. Blind children of school age may be, and for the most part are, sent to day or residential schools at the cost of the local education authority, and are kept there until the age of 16. For high myopes and other children who are partially blind special schools and classes have been organised in London and some other centres, but most country children of this class are either accepted in a blind school or take their chance in an ordinary one. There are not enough of these special classes for the partially sighted. When a blind person is trainable for remunerative employment the Act provides that the local education authority shall secure adequate and suitable provision for this. Actually, this duty is discharged by subsidising voluntary agencies. When the blind worker is trained he becomes "employable." In March, 1932, there were 3342 blind persons employed in workshops for the blind, 1631 in home-workers' schemes, and 4151 others who were employed elsewhere. In order that the blind may earn a living wage it is, as a rule, necessary to "augment" their earnings, and it is also necessary to organise the sale of the goods they produce. A large number of home workers are piano tuners. In order to ensure a proper standard of efficiency in these an examination has been instituted by the Board of Education, and it is their aim that no one who has not passed it should in future be recognised as a home worker.

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[1] H.M. Stationery Office, 1934, 1s.

While schemes of employment concern a considerable portion of those who become blind in early life, a large majority of the rest are unemployable—77 per cent. of the total on the register. According to their individual circumstances domiciliary assistance is arranged. The Ministry of Health has laid it down that it is an essential part of the duty of the local authority to secure that "reasonable provision" shall be made for these persons, either by their own officers, by voluntary agencies, or by the public assistance committees. The number of "home teachers" whose functions include the teaching of Braille or Moon type and pastime occupation has more than trebled since 1919, being 85 men and 325 women in 1932. It is now a condition of approval that they should obtain the home teaching certificate of the College of Teachers of the Blind within two years of appointment. The actual work of organising these services is generally delegated to voluntary associations, of which there is a great variety, providing for technical training, workshops and home workers' schemes, and a number of home teaching societies, these latter especially for the unemployable blind. The voluntary agencies are for the most part organised in counties and groups of counties. Nearly all have united to form the Union of Counties Associations for the Blind. There are also three important organisations whose work is of a national character—the National Institute for the Blind, the National Library for the Blind, and St. Dunstan's.

MASTOPATHIA AND CHRONIC MASTITIS

FACED by the frequent introduction of new terms for disease, it is well to recall MCFARLAND's dictum that pathology must remain confused both in theory and in application unless its terminology is so relieved of ambiguity as to be easily understood. No more obvious failure in this respect could be cited than the redundant terminology of mammary lesions, and especially of the condition commonly called chronic mastitis. A vast literature has collected round this disease, but its nature and significance are still matters of controversy. Some regard it as essentially "a productive inflammatory process," and lay stress on its benign character as evidenced by resolution following non-surgical treatment. Others, and they are the majority, are suspicious of its possible outcome, since records point to its frequent association with malignant development. Much of this uncertainty has arisen, not because of its possibly inflammatory nature—a conception now generally discarded—but because, while the term conveys a fairly definite idea to the clinician, it embraces for the pathologist almost any abnormality in the breast which is neither an acute infection nor a true neoplasm, and also covers various types of hyperplasia which indicate excessive but more or less physiological functional activity, as well as later involutional changes. The term is therefore indefinite and unsatisfactory, and many attempts have been made to find a substitute. SEMB's suggestion, fibro-adenomatosis (simplex or cystica), has not received in this country the attention it deserves; he assumes the underlying identity of the varied types of the disease, glandular, interstitial and cystic, and describes in a logical sequence various degrees of hyperplasia and cyst-formation and their association with other mammary lesions. LENTHAL CHEATLE and CUTLER separate two distinct proliferative conditions, "mazoplasia," described as an exaggeration of physiological activity with epithelial desquamation, spontaneous disappearance at the menopause, and no tendency to neoplasia, and "cystiphorus hyperplasia," a pathological activity with possible outcome in malignant growth.

In a study of mammary enlargement and its symptoms Prof. BECKWITH WHITEHOUSE[1] questions whether these two conditions should be separated, since he has found them very commonly associated in the same organ. He considers that interpretation of microscopical appearances in the breast needs the correlation of cytology with the phase of the menstrual cycle and its possible abnormalities, for while mazoplasia appears to be the result of excessive mammary stimulation by the corpus luteum hormone and subsequent failure of return to the physiological base-line, cystic disease is, in his opinion, the product of similar repeated excessive stimulations, with a breakdown in the balance between secretion and absorption. This may be an explanation, on the functional side, of the progressive cystic enlargement described by SEMB in fibro-adenomatosis cystica. The mammary disturbance is associated, in 70 per cent. of WHITEHOUSE's cases, with oligomenorrhœa, menstrual headache, and mammary pain with swelling—a syndrome ascribed to excessive formation of luteal hormone as a result of over-stimulation by the anterior lobe of the pituitary. For this disorder, on the analogy of metropathia, he suggests the name "mastopathia" and the final rejection of "chronic mastitis." Rational treatment of this functional upset would seem to be inhibition of the hypophysis. Prof. WHITEHOUSE pays a tribute to CUTLER's success with Ovarian Residue and records improvement in his own cases with theelin (œstrin), though in both series the numbers so far are very small.

An estimate of the permanent efficacy of therapy along these lines cannot be made until we have news of the eventual outcome in such cases. Meanwhile it appears that mammary hyperplasia still needs elucidation. Though different types of proliferative activity are observed in the same mammary tissue, their identity as phases in a progressive process cannot be assumed and ascribed to the same functional upset. In "chronic mastitis" two types of epithelial proliferation are usually observed: the one an excessive glandular formation of physiological type, or "adenosis," and the other what WHITEHOUSE calls excessive epithelialisation, preferably "epitheliosis," of individual glandular structures. Adenosis is often associated with puberty and adult mammary enlargement and underlies many temporary menopausal swellings; it may result in fibro-adenomatous tumours, but has apparently no connexion with malignant development. Epitheliosis, on the other hand, is a suspected condition, for though many of the cysts formed by proliferation in the glandular structures become atrophic and permanently quiescent, as in the blue-domed type described by Bloodgood, we have at present no means of determining in situ the final result of cystic activity. We are in fact faced here by the possibly "precancerous" lesion met with in other tissues. The wide divergence of clinical and pathological findings which have been recorded is evidence that the clinician has inadequate guidance in the treatment of these breast conditions, and suggests that further investigation is needed to throw light on the difficult problems of mammary hyperplasia.

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[1] Surg., Gyn., and Obst., February, 1934, p. 278.

LONG LIFE

Common observation suggests that longevity runs in families. Most people could call to mind a family whose members had all reached an age well beyond the Psalmist's allotted span, or (perhaps less readily) one whose members had all died relatively early in life. The drawback to this kind of evidence is that such individual pedigrees may be no more than curiosities; everyday observation tends to put undue emphasis on the extremes and to disregard the normal or average. A family of four, all of whom live to be over 80, is noteworthy and the circumstance is easily remembered, whereas a family of four dying at ages 25, 45, 65, and 80 will attract no corresponding attention. To measure the force of heredity we need a large and unbiased sample of family histories, and so far the material available for study has been somewhat inadequate, being limited to data such as those provided by the peerage, the records of the Society of Friends, and the histories of notable persons and families individually recorded. At first thought it might seem that insurance companies must possess the information required; for an assessment of the weight to be assigned to family history in the prognosis of longevity is of obvious importance to those who sell assurance policies upon lives. A little consideration leads, however, to the conclusion that information provided by the applicant for insurance is useless for the purpose. One flaw is that the age of the parent at death is known in the society's records only if the parent is dead at the time the application for insurance is made. This age is not known if the parent dies after acceptance of the proposed policy-holder. In other words, short-lived parents would be in excess and long-lived parents in defect, since many assurances are effected in early adult life. The second flaw is that "bad" lives do not apply for assurance or on application are rejected, so that those accepted are a physically select group. This explains why workers have fallen back upon the recorded family histories of special social classes. And in these groups a significant, though small, correlation has been found between the length of life of parent and child, and between brother and brother.[1]

In a series of studies on human longevity which is being carried out in the department of biology of the school of hygiene and public health of the Johns Hopkins University, Prof. Raymond Pearl (in conjunction with Miss Ruth Pearl) has approached the subject from a somewhat different angle.[2] By the questionnaire method they have acquired case-histories of 1579 persons living at the ages of 90 years and above, and from these have chosen a group of 365 who could give particulars of the age at death of both parents and all four grandparents. For comparison similar data were extracted from family records already in possession of Prof. Pearl's department. Analysis of this material showed that the average length of life of the six immediate ancestors (taken as a whole) was nearly 16 per cent. greater in the case of the nonagenarians and centenarians than in the comparative group. In addition the average age at death of each one of their six ancestors was substantially higher than that of the corresponding ancestor in the comparative group—a 20–30 per cent. advantage in the case of parents and 10–14 per cent. in the case of grandparents. It was noted, however, that as large a proportion as 13·4 per cent. of the nonagenarian and centenarian group was derived from matings in which *neither* parent was long-lived (long-lived being defined as 70 years or over at death), so that it appears that extremely longevous persons may be bred from short-lived or average ancestry in a small but not negligible proportion. But it may be observed that 45·8 per cent. of the nonagenarians and centenarians, 56·7 per cent. of their fathers, and 53·4 per cent. of their mothers had *both* their parents in the long-lived category, contrasted with 11·9, 37·1, and 30·1 per cent. in the comparative series. A striking difference was also found in the infant mortality-rates; in the long-lived families it was only 59 per 1000, compared with 125 in the life table population of 1901, and 144 in the comparative series. Generally, therefore, these long-lived have kin whose vitality is superior to the average.

To accept these relatively large differences in the duration of life lived by the immediate ancestors, and the sibships, as being due only or mainly to hereditary influences, one must infer that the environmental conditions in the two series of families do not on the average differ significantly—that the long-lived families do not share a common environment superior to that of the comparative series. How far this is true it is impossible to determine. The long-lived persons are, the report points out, not a random sample of longevous persons generally. They are those "whose great age *per se*, or something they did, or that happened to them, caused them to be written about in their local newspapers." A notably long-lived kinship or ancestry might be a factor tending to bring them into the public eye, and this would introduce a bias to the series. Such points make it difficult to exclude completely environmental and selective factors, but in general this interesting study adds to the cumulatively convincing evidence in support of hereditary factors in the duration of life. We still lack an adequate measure of the strength of these factors and evidence as to the mechanism of such inheritance.

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[1] See, for example, Mary Beeton and Karl Pearson: Biometrika, 1901, i., 50.

[2] Human Biology, Feb. 6th, 1934, p. 98.

DINITROPHENOL COMPOUNDS IN OBESITY

During the last two years drugs of the nitrophenol group have been widely used in the treatment of obesity, and it may now be opportune to take stock of the experience gained on both sides of the Atlantic. It is clear that the nitrated phenols are powerful and hence potentially dangerous agents, their principal effect being a substantial acceleration of the basal metabolic rate. Three deaths have so far been recorded, for which dinitrophenol was responsible in two and dinitrocresol in the third. The first fatality followed an enormous overdose taken, it seems, intentionally (J. C. Geiger [1]); the second occurred in a negress who received rather large daily doses of nitrophenol over a period of two weeks [2]; while the third, which formed the subject of a recent coroner's inquest in London, can also be attributed to overdosage for which the patient was responsible. Apart from these deaths there is ample evidence that more or less serious toxic symptoms are not uncommon. Some of this evidence has already been mentioned in these columns,[3] and further instances have more recently been described by J. H. Masserman and H. Goldsmith,[2] who observed unpleasant reactions, notably a fall in blood pressure, tachycardia, acidosis, and stupor in 4 out of 18 psychotic patients treated with dinitrophenol. Such drawbacks, however strongly they may argue in favour of caution and rigid control of the sale of the drugs, do not necessarily provide reason for discarding them, for, as I. M. Rabinowitch and A. F. Fowler [4] point out, some of the most useful drugs in the pharmacopœia, such as morphia and strychnine, are equally open to abuse. But this argument can be pushed too far. The first care of the physician is to do no harm to his patient. He does not prescribe morphia when aspirin will answer his purpose; neither should he use dinitrophenol until he is satisfied that safer remedies are not available. This elementary principle of therapeutics seems in danger of being overlooked.

It might be expected, with reason, that a drug which stimulates metabolism would be valuable mainly in treating conditions in which metabolism is depressed. The clearest example of such an abnormality is myxœdema, but myxœdema is more than a simple expression of slowed metabolism (Dodds and Robertson,[5] D. M. Dunlop [6]), and incidentally is *not* generally associated with conspicuous adiposity; so that nitrophenol is useless as a substitute for thyroxine. In the vast majority of cases of obesity the basal metabolic rate lies within normal limits and the excess fat must in theory, and can in practice, be readily dispersed by simple restriction of diet and increased physical activity. It is true that nitrophenol by raising the basal metabolism will increase the total output of heat from the body and will so permit the self-indulgent to eat their cakes while preserving their figures. But this entails habitual use of the drug; and he would be a bold man who, mindful of what was learnt about nitrated aromatic compounds during the war, would ignore the possibility of ultimate damage to the liver.

To revert to more immediate dangers, two facts may be emphasised: the first that, short of periodic measurements of basal metabolism, which are rarely practicable, there is no way of recognising intoxication from overdosage or idiosyncrasy in good time; and the second that, once the metabolic fire has got out of control, the physician is helpless, for as yet he has nothing with which to quench the flames. The question may be fairly stated thus: is it justifiable, in dealing with a condition which almost always responds readily to a little wholesome discipline, to employ instead a drug of unquestioned potency but uncertain toxicity?

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[1] Jour. Amer. Med. Assoc., 1933, ci., 1333.

[2] Ibid., Feb. 17th, 1934, p. 523.

[3] THE LANCET, 1933, ii., 1098, 1218.

[4] Canad. Med. Assoc. Jour., February, 1934, p. 128.

[5] THE LANCET, 1933, ii., 1197.

[6] Brit. Med. Jour., March 24th, 1934, p. 523.

ANNOTATIONS

COMPULSORY CONSULTATIONS

The March number of *St. Bartholomew's Hospital Journal* contains a rumour that the medical consultations held at the hospital are to be abolished. Let them pass, the surgeon might say, for they are only things of yesterday, mere mushroom growths. The old-time physicians rarely saw the patient; they prescribed for him sitting in a coffee house, upon the report of symptoms told them by the apothecary. They were far too individualistic to consult with anyone, least of all with a fellow physician, unless a great nobleman had the gout or a royal personage was about to die. It was far otherwise with the surgeons.

From the earliest times of which there is any record in London the surgeons were the guardians of the public health and were held responsible for the cure of the sick and maimed. They were on duty at the city gates to see that no grossly diseased person was admitted; and as early as Feb. 2nd, 1369, the chief officers of their gild were sworn to take charge of the hurt and wounded and to give true information to the officers of the city about such persons "whether they be in danger of death or not." A few years later when the barbers had become a company they ordained, in what would now be called their standing orders, that "no barber practising the surgical faculty within the liberty of the city should presume to take under his charge any sick person in actual danger of death or of permanent disability from injury without showing him to the master and wardens." Should he fail to make such a presentation within three days of the patient coming under his care the barber so offending was to pay a penalty of 6*s.* 8*d.* for each day, 5*s.* to go to the chamber at the Gildhall and 1*s.* 8*d.* to the use of the Barbers Company. The master and wardens were to give their advice free, but if the friends of the patient insisted upon making a present "it be evermore divided by the master into even portions under the penalty of a fine of 20*s.*" Moreover, "if they do deny or make refusal to go when so called they equally to pay 20*s.*"

This presentation of the sick and maimed served two purposes. It ensured that the patient was seen by three surgeons of great experience, and it shielded the practitioner in attendance from any subsequent action for neglect or malpractice. Neither was it very arduous. London was a small place in the sixteenth and seventeenth centuries and every part of the city was within a few minutes' walking distance. The system worked well, for there is no record of the master and wardens abusing their privilege; but there are countless instances of shifty and ignorant practitioners being fined for neglecting their duty. The utility of the regulation was so plain that it was adopted by other towns like Newcastle-upon-Tyne, York, and Bristol, where the barber surgeons had formed themselves into a company. In London it fell into disuse after 1745 when the surgeons separated from the barbers, but the shadow of it remained in the newly formed voluntary hospitals and infirmaries. It was customary, even within living memory, to advise every member of the surgical staff when an operation was to be performed, naming the day and hour. They attended, watched, advised, and, when an emergency occurred, assisted. Even at such well-regulated hospitals as St. Bartholomew's, St. Thomas's, and Guy's the comments of the onlooking surgeons were sometimes caustic, and a reputation could be easily lost or won.

Surgical consultations as they now exist are purely educational. They are a feature of Basle and some other continental clinics where the pathologist discusses with the surgeons concerned the post-mortem findings of the week. They have long been a feature at St. Bartholomew's Hospital, and in a modified form they are in use at the Peter Bent Brigham Hospital at Boston, Mass. At St. Bart.'s surgical consultations began at some time between 1850 and 1860, possibly at the instigation of Sir James Paget, who was always solicitous for the improved teaching of medical students. They are still conducted periodically in the manner in which they began, except that they are now held in a special room instead of, as formerly, in the (only) operating theatre. Punctually at half past one on a Thursday afternoon the surgeons and assistant surgeons assemble and with them a crowd of students. A patient is brought in about whose treatment his surgeon has doubts, or who is suffering from a condition which is interesting on account of its rarity or obscurity. The nature of the case is explained in the presence of the patient, who feels thereby honoured above his fellows. Each member of the surgical staff examines and puts such questions as he thinks necessary and the patient is then wheeled back to his ward. Each surgeon in the order of seniority expresses his views and the surgeon in charge of the case sums up. At Boston the method varies somewhat, for it is based on continental lines. Once a week the physicians and surgeons assemble and the amphitheatre is filled with students. The clinical notes of patients who have died are read out; staff and students alike make a diagnosis from the recorded facts. The pathologist then steps forward and records the post-mortem findings. His statements are sometimes surprising but chastening to self-confidence.

AMŒBIC DYSENTERY AND FOOD-HANDLERS

APPENDED to a paper[1] by those responsible for the public health of Chicago is the report of a strong committee appointed to investigate the outbreak of dysentery in that city last year.[2] This committee is convinced from clinical and post-mortem findings that the infection was without question amœbic. Two hotels were concerned, and as soon as the dysentery was reported from city hospitals steps were taken to examine their food-handlers. This investigation disclosed 15 clinical cases and 11 carriers of *Entamœba histolytica*. Since exclusion of carriers from food service had apparently been successful in bringing to an end a similar outbreak in Chicago in 1926–27, it was again brought into effect. But it did not check the new epidemic and a second survey, financed by the hotels in question, showed that the personnel other than food-handlers was widely infected. Accordingly the sanitary equipment of the hotels was investigated. The height of both is too great for all floors to be reached at the pressure of the city's water-supply, and the upper floors have to be served by means of pumps situated in the basement of one of them; they have thus a common feature in their water-supply. Further, they had in common special risks of three kinds. The lay-out of the water and sewerage systems was typical of that of older buildings in Chicago in that there was a possibility of back syphonage from water-closets into water pipes. Moreover, twice within three days in the summer of 1933 heavy rain flooded the basement with diluted sewage, entering an ice-storage room, which it filled to the ceiling, and covering the floor of much of the area where food was handled. Finally there were cross connexions of serious character between water and sewage lines, or between water lines carrying potable water and water potentially subject to contamination. These grave defects were put right as soon as discovered, but up to January of this year there had been over 700 clinical cases of amœbic dysentery distributed over 206 cities, and over 1000 carriers had been recognised in Chicago alone.

The direct issue here has turned out to be one of engineering and plumbing and not of food-handling, for food-handlers were conspicuous victims and not originators of the epidemic. Nevertheless, the committee has rightly raised the question of carriers and food-handling. It holds that no one passing cysts should be allowed to hold that occupation until, seven days after treatment, there have been three negative stool examinations, at intervals of at least one day, and at least four more at intervals of a month. A. Bassler[3] believes that to ensure a parasite-free condition at least three fæcal specimens should be examined three-monthly for a year. Much, however, depends on the method of examination. By a thorough survey of 55 persons in a mental hospital in Sweden, Ruth Svensson and J. F. Linders[4] have compared three methods of diagnosis: at least six smears from formed stools, a single smear from a loose stool, and culture from the latter. They found that, of all infections so discovered, 73 per cent. were detected by the first, 75 by the second, and 94 by the third. In the most conspicuous failure of the first, 13 examinations failed to detect amœbæ, whereas a single examination from a loose stool disclosed them. The Dobell-Laidlaw culture medium was used with added starch and trypaflavine, the Boeck-Debohlav medium disclosing only 61 per cent. of cases. Svensson and Linders lay stress on the observation that the ease with which infection can be demonstrated depends on the tendency to encyst, and that for *E. histolytica* at least three factors govern this—the host, the food of the protozoon, and concomitant bacterial flora. It may differ greatly again in different groups of persons.

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[1] Jour. Amer. Med. Assoc., Feb. 3rd, 1934, p. 367.

[2] See THE LANCET, Jan. 6th, 1934, p. 46.

[3] Jour. Amer. Med. Assoc., March 10th, 1934, p. 786.

[4] Acta Med. Scand., 1934, lxxxi., 267.

It is clear that the tracking down of all carriers among food-handlers is no easy matter, and that there is considerable room for improvement in technique.

TREATMENT OF LEPROSY TO-DAY

IN a review[1] of the treatment of leprosy Dr. Ernest Muir points out that, as no specific remedy is yet available, each writer is guided by his own experience and preference, with the result that the number of methods employed is very large. They range from autogenous and stock vaccines and other protein substances, through the various chaulmoogra compounds, iodides, heavy metals, and a wide variety of irritant drugs, to cauterisation and electrotherapy. Spontaneous recovery is not unknown, and severe infections such as kala-azar and pneumonia have been known to produce surprising improvement, presumably through their general shock effect. Dr. Muir declares that the best results are obtained by raising the patient's general health and resistance to the highest possible level and giving the maximum amount of the most effective special treatment consistent with maintaining the general health. He regards it as important to have a trustworthy means of estimating the patient's resistance. It is, he thinks, a mistake to press the special treatment until a general reaction is produced. The appearance and feeling of the patient are useful, but a patient whose general health is good might still suffer from a lepra reaction. The erythrocyte sedimentation test is invaluable; anything which accelerates sedimentation lowers the resistance to leprosy. When sedimentation is fast it is necessary to proceed with caution and build up the general health; when it is slow the special treatment may be pressed with confidence. Complicating diseases such as malaria, dysentery, venereal disease, pyorrhœa, and other infections and infestations should be corrected as far as possible. To move the patient to a cooler climate is sometimes useful, and a well-balanced diet is essential. The patient should have a regulated daily time-table, with suitable mental and physical occupation to prevent brooding and depression. Physical training should be progressive and include special exercises to correct trophic pareses and deformities.

When the time has come to initiate special treatment, Dr. Muir is insistent on caution, for almost any effective remedy has a depressing effect. The first dose must be tentative, the second should be given only after the negative phase of the first has passed off, and the dosage is gradually raised until the limit of tolerance is reached. This limit may be extended by use. Potassium iodide is considered by most workers too dangerous for general use; the oils appear to give the best results, and of these chaulmoogra or hydnocarpus holds first place. Sodium hydnocarpate or alepol, although less effective than the oil and the esters, has the advantage of being compact and easily preserved. The best method of administration seems to be intradermal infiltration. Oil made from ripe fresh seeds causes little irritation, but, owing to its viscosity, it does not penetrate the intercellular spaces as readily as the esters; this difficulty may, it seems, be overcome if it is heated on a water-bath to 55° C. Oil is much cheaper than the esters and a uniform quality can be more easily secured. The difference in efficacy between the two is not great. The greatest difficulty in treatment is of course the length of time required—three to five years on an average. Good results are impossible without the intelligent and willing coöperation of the patient, and even then the patient should report at frequent intervals for a number of years.

CUTANEOUS MOLES

PIGMENTED moles, or melanomata of the skin, are equally common in the two sexes and very widely distributed. Indeed, there are very few people who cannot show a few small flat brown or black spots somewhere on their bodies, and there is seldom any objection to their appearance. Removal is sometimes demanded, nevertheless, for cosmetic reasons, and provided the lesions are not counted in scores or hundreds it may well be practicable. When undertaken, however, it must be drastic; there must be no tentative applications of caustics, radium, or X rays. The best weapon of attack upon the pin-point to the pea-sized lesion, whether hairy or not, is almost certainly the electrolytic needle. It is very doubtful indeed if the more modern diathermy point offers any advantages over this older method, and in unskilled hands it is liable to cause deep burns and scars.

From the strictly medical standpoint pigmented moles have a more serious importance in view of their occasional (fortunately very rare) tendency to undergo malignant degeneration with metastasis. T. Butterworth and J. V. Clauder,[1] from a review of 500 published cases, are able to give some account of the circumstances under which this degeneration takes place. In 10 of 50 cases of their own it appeared that trauma had a part in causing the change, and to put the proportion of traumatic cases at 20 per cent. is not excessive in the light of observations by others whom they quote. In practice we may say that the slightest change in the appearance of a pigmented mole, whether flat, raised, nodular, or hairy, papillomatous or verrucose, should indicate removal without delay, and by the diathermic method for preference. Probably the most convenient applicator of this "cold cautery" is the snare, which resembles in size and shape that used for removing polypi from the nose. In the frankly malignant cases, it is suggested, a margin of healthy tissue, 3 cm. wide, should be removed at the same time, and this seems advisable even where malignancy is doubtful. The excision should be carried deep enough to include the fascia covering the muscles. Butterworth and Clauder recommend that deep X ray therapy should follow, but do not say whether the diathermy wound should be sutured or not. There should be no objection to an attempt at suture if the wound is free from sepsis at the time of the operation, and not too wide for the edges to come together without plastic procedures which would open fascial planes and increase the risk of spread. The subsequent irradiation, it is proposed, should include the area of lymphatic drainage and the lymph glands associated, and thus far there would probably be complete agreement; but most authorities would be inclined to criticise Butterworth and Clauder's view that the dissection and removal of regional glands is of doubtful value. In the disseminated case such a measure would of course be useless, but in an early case or one of doubtful malignancy most surgeons would advise it. One point cannot be stressed too strongly: the scalpel should never be used to remove the tumour. Furthermore, X rays should not be applied until after its removal, since generalisation, with melanin in the urine, has been observed to follow rapidly in more than one case.

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[1] Internat. Jour. Leprosy, 1933, i., 407.

[1] Jour. Amer. Med. Assoc., March 10th, 1934, p. 739.

The prognosis is worse perhaps in cases of cancerous mole than in any other form of malignant disease, and it is of vital importance to deal with them in their very early stages. By way of prevention it may be said that any pigmented mole which is situated in an area liable to constant slight trauma or irritation should be removed—e.g., on the foot where covered by the shoe, under a truss, on the face when a razor may damage it daily, and under corsets or braces. A mole that is changing its appearance, colour, or size should be removed by diathermy, and the dissection of regional glands should be considered. Caustics must never be used, and even electrolysis is permissible only for such small lesions as can be wholly destroyed at one sitting.

INOCULATION OF LIVING SPIROCHÆTES IN SYPHILIS

THE success achieved in most of the stages of syphilis by the chemotherapeutic methods at present in vogue has overshadowed the possibilities of specific immunisation. A practical obstacle to vaccine treatment has been the difficulty of cultivating the spirochæte in adequate purity and profusion, but this, it is stated, has been overcome by Hilgermann, who has also found means of reducing the pathogenicity of the living organisms. For some considerable time the dermatological and neurological departments of the University of Debrecen in Hungary have had supplies of an "avirulent" living vaccine, and Prof. E. Neuber[1] is able to report on its clinical use. It has not, for obvious reasons, been injected into uninfected subjects; nor is any mention made of its trial upon animals. Of the 215 syphilitic patients treated 42 received vaccine alone for six weeks, followed by bismuth and arsenical combinations. In the other 173 cases the vaccine and chemotherapy were combined from the first; on the average three or four injections of material, in quantity decreasing from 1·0 to 0·1 c.cm., were given, for the most part subcutaneously. Local reactions resembling those produced by injections of tuberculin were common, especially after the earlier and larger injections, and in 62 cases there was a general reaction, with fever, headache, and malaise. The Wassermann reactions became somewhat more pronounced under vaccine treatment, and it was noted that a series of cases treated in the ordinary way—i.e., without vaccines—attained a negative serum more rapidly than those subjected to the combined injections. In the 42 cases treated with vaccines alone (three injections with a fortnight's interval between each) the clinical manifestations were sometimes improved and the Wassermann reaction remained strongly positive, as was anticipated. The clinical improvement was most conspicuous in cases of gummata in the third stage, whether these were ulcerating or still closed; there seems to have been no objective improvement in cases of roseolar or early maculopapular eruption, although improvement was observed in some cases of condylomata, and adenitis was not influenced to any degree. The most interesting observation was that all the cases treated with vaccine responded thereafter in a remarkable manner to injections of salvarsan or its derivatives, whether they had previously been refractory or not. This leads Neuber to hope that the method may be a useful adjuvant to chemotherapy.

JOHN HEYSHAM AND HIS BILLS OF MORTALITY

STIMULATED by Mr. Norman Maclaren, Carlisle has been celebrating the centenary of the death of John Heysham, one of its most distinguished citizens. A special service was held in the cathedral and the Mayor presided at a meeting when Dr. C. W. Graham delivered an oration on Heysham's life and Mr. W. B. Elderton, president of the Institute of Actuaries, spoke of his world-famous tables of mortality.

John Heysham was born at Lancaster on Nov. 22nd, 1753, and went to the village school at Yealand, near Burton, kept by the Quaker brothers Jenkinson. On leaving school he became "doctor's lad" to Mr. Parkinson, surgeon of Burton, and during his apprenticeship pursued the study of birds, which drove him to become expert in the practice of the bow and arrow. His pupilage over he rode on horseback the 170 miles to Edinburgh, where he graduated in June, 1777, with a thesis on hydrophobia (of which he was destined never to see a case in his 50 years' practice). He then sailed from Leith to Rotterdam for a medical tour of Holland, on returning from which he settled in Carlisle, taking lodgings in St. Cuthbert's-lane, where he lived until his death on March 23rd, 1834. Carlisle was at that time beset with itinerant quacks of all descriptions, and Heysham, well equipped though he was with the medical principles of his time, had a struggle to establish himself as the foremost practitioner in the city, and it seems that his annual income never exceeded £400. His commanding appearance, possibly too the conspicuous brightness of his dress, soon served to make him a well-known figure, and his industry was enhanced by excellent health, for he did not have a single day's illness during his life of 82 years, and this in spite of a well-earned reputation as an epicure. Quite early in his career his thoughtfulness for the needs of his poorer patients led him to apply to the Dean and Chapter for a room above the Abbey Gate in which was founded in 1782 the Carlisle Dispensary, which moved later into the Tithebarn, Heads-lane, and in 1857 to its present site in Chapel-street. This record would have secured him affectionate memory among his fellow citizens, but it was a remarkable excursion into medical statistics that gained for him a wider fame. A few months after settling in Carlisle he meditated a census of the inhabitants and the framing of bills of mortality. He first made sure of the number of the population of Carlisle by a method that in point of accuracy almost amounted to a personal registration of each individual family. This exacting work went on until 1787, when his courtship of the daughter of a rich tanner diverted his attention in other directions. His achievement may be stated in Mr. Elderton's careful words: "He counted the houses and inhabitants, tabulated his results, counted the deaths and set out the causes of death, age by age, person by person, recorded influences likely to affect his statistics, and then took a second census similar to the first. . . . In this and similar tedious work," he added, "lie the roots of all discoveries, the proof or disproof of any scientific theory, the test of every social remedy—the measure of all improvement." Heysham's work might have remained unnoticed had it not been for a letter dated Sept. 12th, 1812, written from the Sun Life Assurance office in London by its actuary, Mr. Joshua Milne. "Being engaged," he wrote, "in enquiries relative to Human Mortality, and having met with your valuable Observations thereon that were published at Carlisle in 1797, I have constructed a Table of Mortality from them, whereby it appears that the inhabitants of your city surpass in longevity those of any other place (so far as I am informed) for which a similar table has been constructed." This led to a correspondence between the two men, given at length in an appendix to the "Life of John Heysham," by Dr. Henry Lonsdale (Longmans, 1870). Milne finished his work on the Carlisle statistics in 1815 and his tables were still used for annuity valuations in 1875 and even later. They were adopted by other leading assurance companies as the most trustworthy data, superseding the official system then current, and being accepted both in this country and abroad.

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[1] Dermat. Woch., Feb. 24th, 1934, p. 229.

It was fitting then that the gathering at Carlisle should have been attended by actuaries and representatives of many life offices. The occasion was utilised to support an appeal fund for renovating the dispensary which Heysham founded. This year too will see the opening of the park in the Raffles area of Carlisle provided by a sum of money left in trust to the city by Heysham himself which has been allowed to accumulate.

A CHEST DIAGNOSTIC SURVEY

AMONGST the various schemes for dealing with the unemployed in New York is one which has a wider significance for civic health than the immediate relief of distress. Dr. John L. Rice, the new health commissioner for the city, records an intensive X ray study of unemployed and their families in the form of a chest diagnostic survey, made possible by a grant from the State Temporary Relief Administration. For this purpose the paper roll film which only costs about one third of the celluloid film has been used. Surveys of the first two sections of the city, Central Harlem and Red Hook, made in 1933 have now been published. A third survey in the West Side section is being undertaken under the direction of Dr. Margaret Barnard who has been closely associated with these X ray studies.[1] Some 20,000 persons have been examined, among whom 512 cases of tuberculosis have been found. Hitherto only 15,727 registered cases were known in the city as a whole. Dr. Rice estimates that if the ratio of cases discovered amongst the unemployed of the Harlem and Red Hook sections prevails in New York City as a whole, the cases should total 180,000. Another surprising fact has been the number of positive cases amongst the white population. In the Harlem district the white women led all others in the proportion of pulmonary tuberculosis. In the Red Hook district, although it is predominently white, the group study showed about 54 per cent. more tuberculosis than in the overwhelmingly coloured Harlem district. These studies suggest that in the unemployed population tuberculosis is four and a quarter times commoner in white than in coloured persons, a surprising and unexpected result. The cases discovered have been placed under treatment.

Use of the paper film has not only lowered the cost of this survey to an economic level, it has enabled the physician to take skiagrams of more than 500 persons a day. Another advantage claimed is the ease and convenience with which the pictures can be read and interpreted, together with an attainment of uniformity in quality. Each picture bears on its face full data regarding the subject—name, address, sex, weight, height—so that time in record making is saved. The diagnosis also may be added to the film, thereby making a complete record of each case. Each 20-ft. roll film contains 100 pictures. The preliminary report issued by Dr. Rice gives no detailed analysis of the X ray findings so that it is not possible at the moment to estimate the value of the paper as against the celluloid film in differentiating between active and inactive, early and obsolete lesions, but the figures are sufficiently impressive to warrant a careful comparison of the two kinds of film in the same patient over a large series.

ILLICIT USE OF NARCOTICS

IN the last report of the advisory committee on the traffic in dangerous drugs to the Council of the League of Nations attention was called to a practice which is becoming prevalent in the Far East of smoking heroin pills. An analysis of these pills made by Prof. E. Knaffl-Lenz, of Vienna, showed that they contain caffeine as well as heroin and sometimes also strychnine or quinine. It appears that at least one-third of the heroin content would pass over to the consumer in the smoke and is capable of producing its physiological effects.

The report of a subcommittee on seizures of illicit drugs contains interesting information regarding contraband traffic in the United States, whence more seizures have been returned than in any other single country. The heaviest arrivals of raw opium were on the Atlantic coast, mostly from Italian ports but of Turkish origin. On the other hand, "prepared" opium reached the States on the Pacific coast by ships from the Far East en route from Hawaii. Illicit morphine entered the States by various routes—e.g., from Japan and China on the Pacific coast, from French ports on the Atlantic sea-board, and from Germany through Central American countries. It is reported that "all the circumstances point to a continuance of illicit traffic in morphine from Western Europe to the United States on much the same scale as for several years past, with a development of new methods of concealment and transportation." Appreciation is expressed at the valuable coöperation of enforcement officers in the United Kingdom, Canada, Egypt, France, Germany, and the Netherlands in tracking and exposing the agencies employed in this illicit commerce. Although the position is certainly better than it was a few years ago yet "it is by no means safe to conclude that illicit import is decreasing."

THE death is reported from South Africa of Dr. Charles Porter, for many years medical officer of health for Johannesburg.

AN election will take place in July next for members of the Council of the Royal College of Surgeons of England. There are four vacancies, and the following Fellows are standing for election :—Ernest William Hey Groves, George Grey Turner, Hugh Lett, C.B.E., Alfred William Sheen, C.B.E., Duncan Campbell Lloyd Fitzwilliams, C.M.G., Gwynne Evan Owen Williams, Ernest Cranmer Hughes, O.B.E., and William Girling Ball. Of these candidates the first three are retiring from the Council in rotation and offer themselves for re-election.

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[1] THE LANCET, 1932, i., 950 and ii., 247.

PROGNOSIS

A Series of Signed Articles contributed by invitation

I.—PROGNOSIS IN GALL-BLADDER DISEASE

To the patient suffering from gall-bladder disease, especially that form of it which is associated with recurrent attacks of severe pain, the practical problem of relief depends on the likelihood of improvement or cure under medical measures or the dreaded necessity for operative treatment.

Does inflammatory disease of the gall-bladder ever clear up completely? Does it often pass into long periods of quiescence? If gall-stones have formed may they, under treatment, dissolve or be passed by the bowel? Is the patient's general health likely to suffer from the presence of a diseased gall-bladder, and is any risk to life run by leaving a diseased gall-bladder in situ? Does surgical treatment involve much risk to life? If survived, will the operation relieve all the symptoms? What chance is there of the trouble recurring after operation? Does removal of the gall-bladder per se give rise to any disagreeable or disabling symptoms? Does the presence of a stone or stones in the common bile-duct make the operative risk and the future prospect grave? What is the outlook from operation in the patient who is deeply jaundiced?

These and other questions are being raised daily in practice, and in this communication I will endeavour to answer them.

Might I first emphasise the difficulty in some cases of being sure of the diagnosis and thus of assessing the value of various forms of conservative treatment? I have on more than one occasion, whilst operating for another upper abdominal lesion, exposed a perfectly normal gall-bladder, the known disease in which was said to have been kept in abeyance for years by careful medical treatment. It is inevitable, therefore, that in any series of cases treated on medical lines, we will have a number in which the diagnosis was sufficiently in doubt as to make accurate statistical record impossible. On the other hand, we have a sufficiency of cases in which the diagnosis was clear, and in which medical treatment was employed, to give an approximately accurate estimate of prognosis.

CHANCES OF SUCCESS WITH MEDICAL MEASURES

Have we any reason to doubt that inflammation in the gall-bladder will clear up completely in a certain number of cases? We know that cholecystitis is frequently a chronic and indolent disease; that the causal organism is embedded in the gall-bladder wall and is killed or dislodged with difficulty. We also know that the common association with gall-stones and the intermittent obstruction of the cystic duct which is liable to take place aggravates and perpetuates the cholecystitis. None the less it is true that in a certain number of cases of indubitable cholecystitis, symptoms have disappeared for long periods of years after medical treatment and a lasting symptomatic cure has been effected.

If we have diagnosed the presence of gall-stones, either from typical biliary colic or from X ray demonstration, what chance is there of cure by medical treatment? It may be said at once that no known drug or diet will cause the solution of gall-stones. Can we induce the passage of the stones by way of the ducts and bowel? There is no question that sometimes after the administration of generous doses of olive oil a number of small stones may pass, and this form of treatment is well worth a trial, provided we do not know that there is a stone present the size of which makes passage down the ducts impossible. Experience points to the percentage of cases in which such treatment can be followed by lasting success being extremely small—in the region of 5 per cent.

We have obtained abundant evidence in the past few years of the sinister consequences of untreated gall-bladder infection. Firstly, a stone may lodge in the common bile-duct and give rise to the disabling, and sometimes dangerous, symptoms which follow obstruction of the duct. A suppurative obstructive cholecystitis may be followed by a subphrenic abscess or a pylephlebitis, or a large stone ulcerating through into the intestine may cause acute intestinal obstruction. A pancreatitis, either of the slow sclerosing variety or of the dangerous acute hæmorrhagic type, may develop. Toxic changes in the heart muscle, in the fascial planes, in joints and in kidneys, resulting from absorption of organisms and their toxins from the chronic infective focus in the gall-bladder, are now known to be not infrequent sequelæ of cholecystitis.

Apart then from the dangerous complication where life is in jeopardy, an indolent gall-bladder infection may play a definite and important rôle in bringing about those degenerative changes which, coming on in late middle life, precipitate the patient into a premature old age.

FACTORS DIMINISHING OPERATIVE RISKS

What is the immediate risk attached to operations on the biliary passages? It is obvious that the answer to this question depends on several factors—viz., the care taken in pre-operative preparation, the skill and experience of the surgeon, and the quality of the nursing in the post-operative period. Many patients with biliary disease are bad subjects for operation. They are often very stout and breathless on exertion, and in some cases are poisoned and jaundiced.

The immediate prognosis will be greatly improved if an appropriate pre-operative régime be instituted. If the patient is very obese a delay of three months, during which weight is reduced on a suitable diet with regulated exercise, will facilitate the operative manipulations, and, by ensuring well-maintained cardiac action, will lessen the risk of post-operative thrombosis and embolism. Since adopting a period of pre-operative dieting and physical training in stout, flabby subjects, I have found my mortality-rate in biliary surgery has been reduced to half its previous level. An adequate pre-operative supply of fluid and sugar is another safeguard, especially in cases in which an infected and obstructed common bile-duct has led to loss of weight and impairment of hepatic efficiency.

In uncomplicated cases of gall-bladder disease in which operation has been undertaken on account of recurring colic or chronic dyspepsia, the risk to life from removal of the gall-bladder should not be more than 2 per cent. Evacuation and drainage of the gall-bladder in such cases should bear an even lower mortality; but it is not advised because a diseased organ is left behind, gall-stones recur in approximately 10 per cent. of cases, biliary dyspepsia may persist, and, in some cases, carcinoma of the gall-bladder develops.

Emergency operations.—In cases of acute obstructive cholecystitis where the condition does not yield to expectant and medical measures, operative treatment of an emergency nature must be undertaken. This should consist merely in an exposure, opening and evacuation of the gall-bladder, followed by drainage. In elderly subjects with a tendency to chest complication this operation is by no means free from risk. A preliminary narcotic and local anæsthesia will permit of adequate access and is well tolerated. Where the gall-bladder is partly gangrenous *B. welchii* is usually found. In such cases the abdominal wound should be left open and packed and anti-welchii serum—40 c.cm.—given at once. After such emergency operations recovery may be complete and lasting. My experience has been, however, that in 50 per cent. of such cases symptoms recur, often with the formation of further stones, and in two of my cases with the development of carcinoma of the gall-bladder. Owing to this tendency to persistence of some of the symptoms, to the recurrence of stones, and to the development of malignancy, the operation of drainage of the gall-bladder has been largely superseded by that of removal.

RESULTS AFTER OPERATION

What chance is there of persistence of symptoms after removal of the gall-bladder? We find, from a follow-up, that the patients are relieved of symptoms in over 70 per cent. of cases. The poor results and the qualified benefit are found, for the most part, in the cases in which the pre-operative symptoms were somewhat atypical and the pathology disclosed at operation was not gross. Flatulence, heartburn, and intolerance of fats are the usual residual symptoms. Occasionally attacks of colic will persist after operation, to the chagrin of both patient and surgeon. Such attacks may mean that a stone in the common bile-duct has been overlooked or merely that the sphincter of Oddi is still subject to spasm. Patience and belladonna are indicated for some months after operation in such cases, and only if jaundice supervenes should further operative interference be considered.

There is a fairly widespread impression that after removal of the gall-bladder a patient never quite regains normal digestion. This is quite erroneous. I have questioned many hundreds of patients on this point and the unanimous verdict is that digestion is as good as ever and better than for many months or years before operation. The only exception is where a functioning gall-bladder, the seat of early disease, has been removed; here for some months vague digestive disturbance results but in course of time gradually disappears.

An analysis of the cases in which, following cholecystectomy, troublesome symptoms have persisted has shown that in the majority the disease in the gall-bladder was mild in degree and without stones, and at operation some hesitation existed as to whether extirpation of the gall-bladder was justifiable. In such cases the diagnosis was probably wrong and the operation of cholecystectomy must bear unwarranted discredit. In some cases a stone in the common bile-duct had been overlooked and little, if any, benefit has resulted. In some such cases the disappointed patient will have no further surgical interference; in most, luckily, the patient consents to a second operation, when the duct is cleared, the patient relieved, and surgery rehabilitated.

The lesson is that the common duct should always be displayed and, if any doubt exists, opened and explored at every operation on the biliary tract.

STONE IN THE COMMON BILE-DUCT

When a diagnosis of stone in the common duct is made, surgical treatment should always be recommended. The possibility of a stone, which has been arrested in the duct, passing on into the duodenum becomes less with every day. Surgical treatment, whilst imperative, should not be precipitate. If intermittent jaundice and fever have punctuated the course of the illness, operation should, if possible, be timed to occur with a waning jaundice and a receding infection. When this can be done the risk of operation does not exceed appreciably that of cholecystectomy. If, on the other hand, the obstruction of the duct is complete, jaundice progressive, the stools devoid of bile, and the patient apathetic and drowsy, operation is demanded without undue delay and the prognosis must be guarded.

In the first case chemical disinfection of the ducts by large doses of hexamine and the "schutztherapie" for the liver—glucose and insulin—may with advantage be carried on for a week or more. In the second case intensive pre-operative therapy over a period of 48 hours by intravenous administration of fluid and glucose, of calcium chloride, and of blood, will lessen the considerable risk of hæmorrhage and of hepatic insufficiency, but will not render safe what must be at all times a dangerous procedure.

If on opening the common duct colourless fluid escapes—white bile—this is an index of severe back pressure on the liver and a bad prognostic feature; it calls for special efforts to promote liver function by fluid, glucose, and by diathermy to raise the temperature of the liver.

In spite of all our efforts the death-rate in the deeply jaundiced patient will remain high, not less than 20 per cent. Consequently, we should see to it that patients presenting symptoms of stone in the common duct are not left until they reach a dangerous condition requiring desperate measures.

CARCINOMA OF THE GALL-BLADDER

When malignant disease of the gall-bladder occurs it is almost invariably as a sequel to gall-stones. The gall-bladder is not a very common site for cancer—I have had to deal with 32 cases among some 800 cases of gall-stones, and in just over 1000 operations on the biliary passages. Frequently it does not declare its presence until, on the one hand by obstructing the neck of the gall-bladder, it gives rise to a palpable mucocele or empyema of that organ, or on the other hand by pressure exerted by invaded lymph glands on the common duct it causes jaundice. Seldom, therefore, can the growth be successfully removed—the only successful cases in my experience are those (two cases) where it was discovered accidentally on opening a gall-bladder removed for gall-stones. In all other cases where removal was attempted early recurrence in the liver has taken place. Practical experience of these cases convinces one more and more of the advisability of removing and not simply draining the diseased gall-bladder.

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AT the recent annual meeting of Melksham Cottage Hospital it was announced that the hospital is about to receive the legacy of £100,000 bequeathed by the late Mrs. Ludlow-Bruges, who formerly lived in the neighbourhood. Owing to the appreciation of securities the sum mentioned will probably be exceeded. A new wing is to be built with a portion of the money. The year 1933 closed with an adverse balance of £639, and the rating assessment of the hospital has been raised from £10 to £87.

SPECIAL ARTICLES

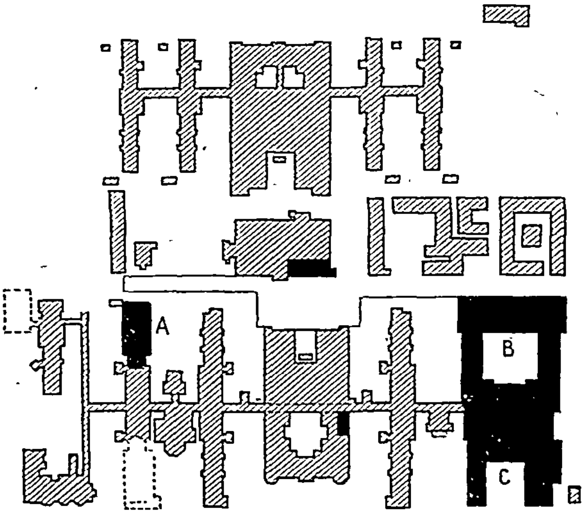
BRITISH POST-GRADUATE MEDICAL SCHOOL

BUILDING is progressing rapidly at Hammersmith Hospital in fulfilment of the scheme which, if all goes well, is to produce by December the framework of a new post-graduate medical school. The foundation-stone was laid last July[1] by Mr. Neville Chamberlain, Chancellor of the Exchequer, in the presence of Sir Austen Chamberlain, chairman of the Governing Body, Lord Athlone, chancellor of the University of London, Sir Hilton Young, Minister of Health, and Mr. E. M. Dence, chairman of the London County Council. The scheme is the joint concern of H.M. Government, the University of London, and the London County Council, and by the courtesy of the Governing Body and the Council we are able to reproduce here the detailed plans of the new buildings.

The foundation of a new medical school in London is in itself an event of some interest. No one living can remember the foundation of any of the 12 undergraduate medical schools in the metropolis. Their growth and development has been dictated by experience of their particular needs, reconciled as far as possible to exigencies of site, finance, and available space. The new post-graduate school is a building de novo, not like the hospital to which it is attached, an adaptation and extension of existing premises; it has been designed and is being carried out solely to embody the ideals of its promoters. What these intentions are may be gathered from the report of the 1930 committee which set out to provide facilities for at least three different classes of students. In the first place, in addition to the permanent teaching staff (professorships in four subjects—medicine, surgery, gynæcology and obstetrics, and pathology—have been advertised), the provision of courses by visiting experts, including acknowledged leaders in medicine and surgery, should, they thought, attract students from the Empire and abroad who at present have no means of taking advantage of practical work in this country. Secondly, they bore in mind the further need for scientific training on the part of those who have qualified at one or other of the British undergraduate medical schools, either in London or elsewhere, with the expression of a hope of bringing these schools into closer interrelation than exists to-day. Thirdly, they were keenly aware of the need of short and highly concentrated refresher courses for practitioners, especially those in the country, to keep them in touch with new developments in medicine and surgery. As one example there are 17,000 practitioners working under the National Health Insurance Acts, and year by year a certain proportion of these should have a chance of taking such courses at a post-graduate school. The plans of the school will be closely scrutinised to see how a committee of great distinction has sought to put these objects into being.

THE CHOICE OF SITE

A domicile for the post-graduate school was a matter which had perplexed and eluded successive committees. The ideal solution of a new hospital specially built and equipped was finally turned down even in times of less financial stress than the present; overtures to one and another of the undergraduate teaching schools, although long entertained, ultimately came to nothing. Four years ago an association with an existing voluntary hospital was becoming definite, when it was seen that the London County Council was itself shortly to be charged with the duty of providing and maintaining public accommodation for the sick poor in London, and the attachment of the school to a public municipal hospital became a new and exciting possibility. The choice gradually narrowed down to hospitals at Lewisham and Hammersmith (Ducane-road), and finally fell on the latter. The choice of site may be regarded as a happy one, for the hospital is finely situated to the south of a large area of open ground known as Wormwood Scrubs, which is assured in perpetuity. On the west lies the famous prison; and the extensive plot on the east will also remain open, for it has been acquired by the governors of St. Clement Danes grammar school. Ducane-road itself ceased to be a main thoroughfare when Western-avenue was pushed through parallel to it 100 yards away. Between them lies the Central London Railway, on which the new London transport board should be willing to make a stopping place near the entrance gate of the hospital, which would then bring it within a quarter of an hour of Oxford Circus. The grounds of the hospital itself cover 14 acres, and provide ample room for further building.



Lay-out of the Hammersmith Hospital, showing existing buildings in grey and additions in black. A is the new hospital wing, with a group of operating theatres. B is the medical school proper. C is the new casualty and out-patient department.

THE EXISTING HOSPITAL

The hospital now contains 400 beds, a modern maternity ward with 16 beds and an antenatal clinic, but is without tuberculosis or venereal departments, or any organised out-patient department except for the following-up of previous in-patients. The buildings were not carried out completely as planned[2] in 1905 by the architects, Messrs. Giles, Gough, and Trollope, when economy already stepped in, but the ward blocks are well built and serviceable with a certain dignity about them. The administrative block, as in so many of the legacies from the poor-law, has a number of the best characteristics of the comfortable private house. Important additions were made when it was taken over during the war, and remained from 1918–24 as an orthopædic hospital of the Ministry of Pensions; an excellent range of workshops was built, and a fine room for remedial exercises which now serves usefully as a common room and lecture room for the nursing staff. At this time was built on a temporary basis, but still functioning heartily, a fine operating theatre to the specification of the late Sir Robert Jones. The long east-west corridor which crosses and links up these buildings conveniently will make it readily possible for every ward in the hospital to be used for teaching purposes, and for a case in any of them to be transferred in bed to the clinical theatre of the new medical school. The old stationary beds are already being replaced by wheeled ones—four wheels perhaps would be better than two, and, before it is too late, the committee might consider the ingenious plan adopted at the Clavadel surgical clinic of putting rubber-tired discs on all four legs about a foot from the ground, and a metal strip at corresponding height along all the corridors that the beds are likely

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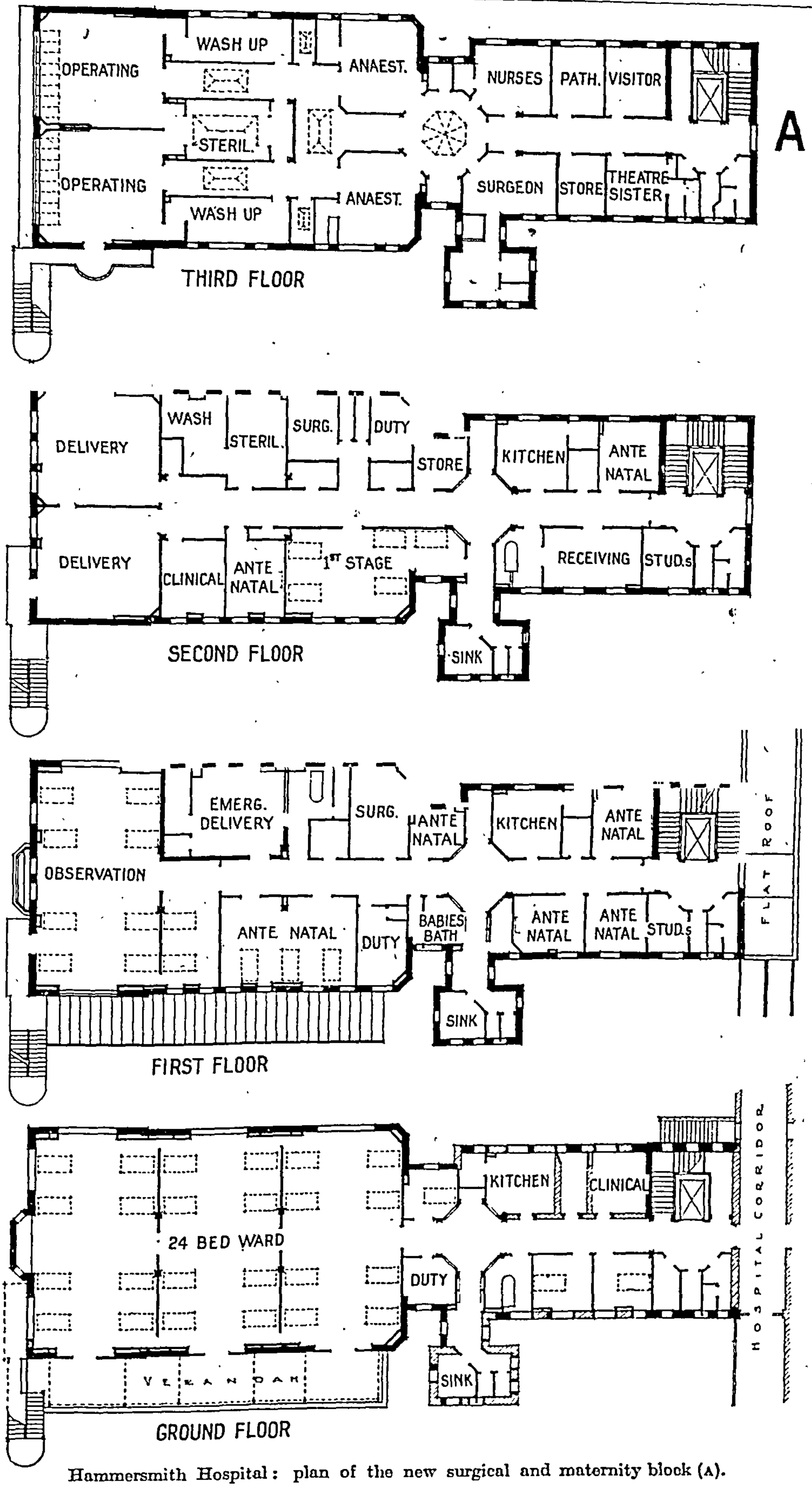
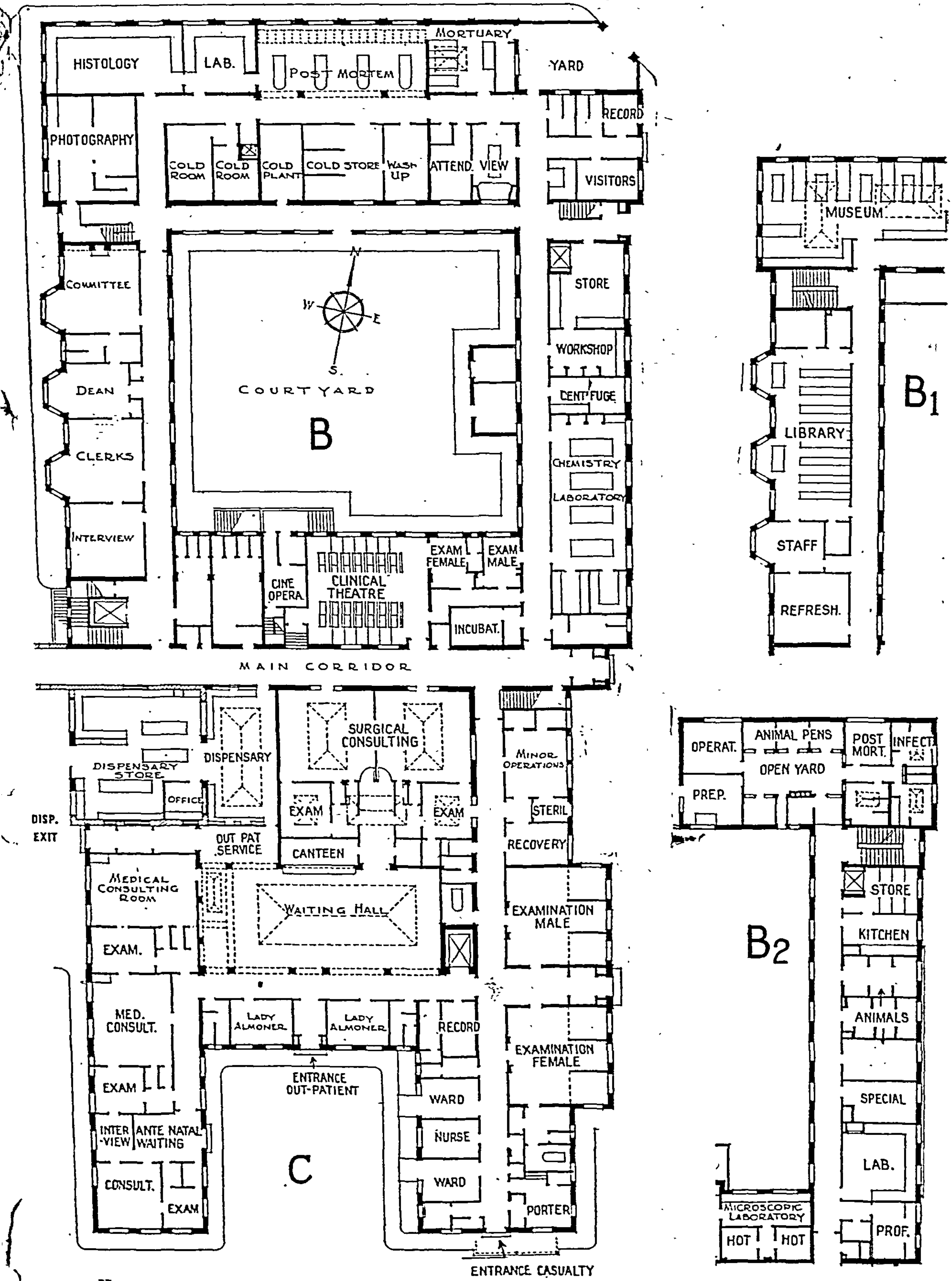
[1] See THE LANCET, 1933, ii., 199.

[2] Ibid., 1930, i., 881.



Hammersmith Hospital: plan of the new surgical and maternity block (A).



Hammersmith Hospital: ground-floor plan of the medical school (B) and new out-patient department (C). Parts are also shown of the first floor (B₁) and second floor (B₂) of the medical school.

to traverse—a device which saves the inevitable scratching of the plaster.

At the present time the northern half of the site is occupied by an institution not yet appropriated by the public health department of the L.C.C., and still occupied by infirm aged persons. The central block of this building already serves as quarters for some of the resident staff, and could be further so utilised to almost any extent—incidentally its northern outlook is on a particularly sequestered parcel of ground behind the rifle butts, already used by birds as a sanctuary. It is part of the organisation committee's plan to provide accommodation for a limited number of post-graduate students, some of whom would during their period of residence be holding temporary appointments on the staff of the hospital as internes. When this section is appropriated next year two of the four wings might provide the promised material for the study of chronic disease not usually available at voluntary hospitals; the other two wings would become available for extension of accommodation for nurses, who are unfortunately not in so favourable a position as had been hoped. The original nurses' home can only accommodate about half of the nursing staff at present required, and the personnel is scattered in three different parts of the hospital. The new nurses' home which had already been contemplated by the guardians before the hospital came into the hands of the L.C.C.—to be built for 100 nurses in the first instance, and capable of enlargement so as to house 200 to 250—came under the economy axe, and later was one of the items sacrificed when the Government grant to the new scheme dropped from £250,000 to £100,000, and the expenditure of an equivalent amount contemplated by the L.C.C. was correspondingly reduced.

As will be seen from the lay-out plan, the new building comprises three sections: (A) a surgical ward and maternity section with a dual group of operating theatres designed to complete the equipment of the hospital; (B) the medical school proper; (C) a new casualty and out-patient department with special X ray departments on the first floor, and a skeleton second floor pending ultimate requirements. The minor additions marked on the lay-out are for a new boiler in the engine-house and a central sterilising room in the basement of the central block.

NEW SURGICAL AND MATERNITY BLOCK

This (marked A in the plan) is an extension in four stories of the northern wing of an existing block of the hospital. It abuts directly on the main east-west corridor and has a full-sized lift which will make it possible for a bed to be wheeled from any part of the hospital to any floor of the new block. On the ground floor is a surgical ward of 24 beds, opening freely to a verandah on the west side; it may be hoped that the roof of this verandah is on the cantilever principle, leaving nothing to obstruct the outlook. The beds are arranged on the lengthwise principle now familiar at the new Southend hospital, but differing slightly owing to the width of the building, which made it necessary to place four beds instead of two in each compartment. On this floor there are also three small one-bed wards. The first and second floors are taken up by a well-equipped maternity department, the plan of which is still subject to minor variations. On the first is an observation ward of eight or ten beds, with an emergency delivery room and a number of small ante-natal rooms. On the second are two large delivery rooms, as well as a ward of five beds for the first stage, and other accessory rooms. On the third floor are two identical operating theatres facing due north, each with its own suite of anæsthetising ante-room and a wash-up room for the surgeon and his assistants. The sterilising room, which occupies a central position, is top-lighted. A study of the plan will show to what extent experience has been utilised in the arrangements for system and cleanliness.

THE MEDICAL SCHOOL

This (marked B on the plan) occupies the north wing of the new east block; it consists of three floors around a central courtyard. On the ground floor is the clinical theatre, with seating room for 100 students, directly abutting on the main east-west corridor of the hospital, with a room for a cinema operator on the one side and examination rooms for patients on the other. On the north side of this floor is a very complete pathological department centring around a top-lighted post-mortem room with four tables, attached to which is abundant cold storage. The adjacent mortuary opens on a yard with a separate entrance to the street and completely cut off from the rest of the hospital. Alongside are rooms for histology and photography, and a service lift to take material up to the museum and preparation laboratories on the floor above. On the east side are chemical laboratories with workshops, stores, and centrifuge room; on the west side are the committee room, the offices of the dean and clerical staff. On the first floor, of which only the north-west portion is reproduced here (B_1), are the library and museum, as well as the lecture theatre which lies over and duplicates the clinical theatre below. Here are the laboratories for the professors and a number of other laboratories large and small, with a small refreshment room, an earnest of the restaurant which is one of the desiderata in the next extension, when presumably space will be found for it in the northern administrative block. On the second floor, of which only the north-east portion of the plan is reproduced here (B_2), is a large animal section with preparation, operating, and post-mortem and infectious rooms, abundant pens and cage accommodation. All this is opening on a flat roof and completely shut off from the rest of the building. On this floor also are microscopic and other laboratories, with hot rooms and autoclaves. The completeness of the arrangements for pathology suggest the intention of a full-time chair in this subject, as well as in medicine, surgery, and obstetrics. Pædiatrics and most of the specialties will still have to be studied elsewhere. On the other hand, the arrangements will be elastic enough to provide material for the "ad hoc" teaching on which Lord Dawson has laid stress, and especially for experienced teachers from overseas to take a share in the curriculum. The noteworthy absence of the specifically preventive side of medicine is accounted for by the fact that complete provision is made for post-graduate teaching of this at the London School of Hygiene and Tropical Medicine at Keppel-street.

OUT-PATIENT DEPARTMENT

This (marked C on the plan) is a novel feature for one of the L.C.C. hospitals. In justifying to the ratepayers the outlay of some £100,000 on this and the surgical block the chairman of the central public health committee pointed out how greatly these additions will improve the medical and surgical treatment of the sick of London and enhance the value of the Council's hospital service. The concentration at the school of the best medical and surgical skill available to teach on modern lines will give opportunities to the Council's medical staff of instruction in the most modern methods of treatment; patients from any of the Council's hospitals can be sent to Hammersmith for the purpose of diagnosis and the specialised treatment available there. The hospital is situated in a rapidly growing neighbourhood—East Acton has sprung up almost in a night—and there is no casualty department nearer than the West London Hospital, 1¾ miles away. The department occupies the whole south wing of the east block, and is situated just opposite the main entrance to the hospital. Nearest to the gate is the entrance for casualties adjoining the porter's lodge; here are two small wards separated by the nurses' room, with ready access to all the other facilities of the department. The entrance for out-patients is in the centre of the block, and opens into a top-lighted waiting hall with sitting room for 300 persons, served by a canteen. Opening out of this hall are two rooms for the lady almoners and suites of consulting and examination rooms, including a theatre for minor operations with recovery room. There is a separate antenatal section with its own entrance. A large new dispensary serves both the main hospital and the out-patients, who have their own entrance and exit. The first floor of this block, which is much reduced in size, contains on the one side a large X ray therapy section, and on the other dental rooms, rooms for heart and lung and gastro-intestinal cases, conveniently separated by the dark room, a fracture room, and various other rooms whose use is likely to be determined by experience. The second floor of this block will remain in skeleton pending ultimate requirements.

We may conclude this account of the buildings themselves with a reminder that the agreement between the London County Council and the Governing Body of the School may be considered to be of a permanent character, although the licence granted to the School for occupation of the new premises is restricted to a term of 999 years. The appointment of the professorial and technical staffs is a matter for agreement between the two bodies. The responsibility for the care of patients will continue to rest with the Council, and while the proper duty of the School is teaching the two functions are in practice inseparable, at least with regard to the more senior posts. The School will depend for its main income on a grant from the University Grants Committee administered through London University (which has two representatives on the Governing Body), but will also receive a payment from the Council in respect of services rendered to the hospital, and, in addition, fees will be charged to students attending courses. The agreement between the two bodies further provides for the setting up of a joint committee, on which the School and the hospitals and medical services committee of the Council will be equally represented, in order to determine all matters of joint concern.

COVENTRY AND WARWICKSHIRE HOSPITAL.—The management of this hospital has decided to acquire the adjoining City Fever Hospital, alter, enlarge, and equip it as an extension. An appeal is therefore being issued for £100,000, which would make it possible to pay off the overdraft of £25,000. The existing facilities have become hopelessly inadequate. The out-patients' department can no longer cope with its rapidly growing attendances, and there is a waiting-list of between 150 and 200, and delicate technical treatments are being given in crowded and unsuitable temporary premises. The extension fund at present stands at about £30,000, and the cost of acquiring the City Hospital will be £65,000.

SURPLUS MILK AND SAFE MILK

A POLICY IN OUTLINE

THE steps the Government proposes to take to increase the consumption of milk and improve the supply were described in the House of Commons[1] on Feb. 22nd. Anxiety, however, has been expressed in the medical journals[2] and elsewhere lest the advantage of greater consumption should be bought at the price of safety—especially the safety of children—and it has been emphasised that the support of the profession will be withheld from schemes which do not include satisfactory arrangements for preventing the transmission of bovine infections.

On March 8th a meeting was held at the London School of Hygiene and Tropical Medicine, with Prof. G. S. Wilson in the chair, and a memorandum on the Government's milk policy was drawn up. We publish here a list of the signatories, followed by passages representing the greater part of their statement.

Dr. J. A. ARKWRIGHT, F.R.S., hon. member of bacteriological staff at the Lister Institute of Preventive Medicine; member of the Medical and Agricultural Research Councils.

Mr. J. C. DRUMMOND, D.Sc., professor of biochemistry in the University of London, at University College.

Prof. J. C. G. LEDINGHAM, M.D., F.R.S., director and chief bacteriologist of the Lister Institute.

Mr. F. C. MINETT, D.Sc., director of the research institute at the Royal Veterinary College.

Prof. H. RAISTRICK, F.R.S., professor of biochemistry in the University of London, at the London School of Hygiene and Tropical Medicine.

Dr. G. S. WILSON, professor of bacteriology as applied to hygiene in the University of London, at the London School of Hygiene.

Mr. N. C. WRIGHT, Ph.D., director of the Hannah Dairy Research Institute.

The Memorandum

The desirability of increasing the consumption of liquid milk is admitted on both economic and public health grounds. Investigations on children have shown conclusively the value of a daily ration of milk in promoting physical growth and development. There is reason to believe that the raising of the per caput consumption of milk from its present value of between one-third and two-fifths of a pint to a higher level would be attended by most beneficial results. A propaganda campaign to achieve this object would probably receive the strong support of the medical and veterinary professions, provided satisfactory assurances were given as to the safety of the milk so supplied.

NECESSITY FOR A SAFE MILK-SUPPLY

Evidence is accumulating rapidly that the raw milk-supply of this country is often heavily infected with micro-organisms capable of producing disease in man. An average of 6·7 per cent., running up in some districts to as much as 20 per cent., of samples of raw market milk are infected with virulent bovine tubercle bacilli. Approximately 20–30 per cent. of raw milk samples can be demonstrated to contain *Brucella abortus* which causes both contagious abortion in cattle and undulant fever in man. It is therefore not surprising that in England and Wales about 2000 deaths every year, mainly in children, occur from tuberculosis of bovine origin, and that at least 4000 fresh cases of this disease are notified annually. The occurrence of undulant fever has only been recognised of late years in this country, and its exact incidence is unknown. There are grounds, however, for believing that about 500 cases of active infection with *Brucella abortus*, derived to a considerable extent from milk, occur annually in England and Wales. This estimate, it may be noted, agrees well with the figures of other countries having a similarly infected bovine population.

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[1] THE LANCET, March 3rd, p. 491.

[2] THE LANCET, Feb. 24th, p. 405, and March 10th, p. 526; Brit. Med. Jour., Feb. 24th, p. 339.

Besides tuberculosis and undulant fever, numerous milk-borne outbreaks of scarlet fever, septic sore-throat, diphtheria, enteric fever, dysentery, and gastro-enteritis have occurred of late years. We may mention, in particular, two recent outbreaks, one of septic sore-throat at Hove resulting in over 1200 primary cases with 65 deaths, due incidentally to consumption of raw milk coming from an exceptionally well-managed farm, and one of paratyphoid fever at Epping involving 312 persons with 8 deaths.

It is impossible scientifically to escape the implication of these facts—namely, that no raw milk can be guaranteed as safe for human consumption. Milk from tuberculin-tested herds is for all practical purposes free from the risk of conveying tuberculosis, but, as experience both in this country and the United States has shown, it is capable of carrying other infections.

Milk is so liable to contamination, not only from the cow, but also from infected water-supplies used for cleaning utensils, and from human carriers and early cases of disease during its production and distribution, that it must always be considered as potentially dangerous in the raw state.

We do not wish to convey an exaggerated impression of the frequency of milk-borne disease, but we do wish to point out that the potential dangers of raw milk are such as to preclude members of the medical profession who are acquainted with the facts, and who are responsible for the health of those under their care, from recommending it for human consumption.

The logical conclusion to which this argument leads is that all liquid milk should be submitted to some form of adequate heat treatment, preferably low-temperature pasteurisation. There is no doubt that pasteurisation carried out under commercial conditions in properly designed plant efficiently operated can be relied upon to render milk safe. We are of opinion that ordinary raw milk should be pasteurised under official control, and that every step should be taken to ensure that pasteurisation is efficiently performed.

There is reason to believe that if the present Milk Designations Order was amended so as to permit of the pasteurisation of milk from tuberculin-tested herds it would meet with strong support from the medical profession. Hitherto very little progress has been made in the establishment of these herds, partly because the medical profession has no confidence in the safety of Certified and Grade A (T.T.) milk, so far as the risk of conveying diseases other than tuberculosis is concerned. If permissive powers were given to pasteurise milk from tuberculin-tested herds, there would become available a clean safe milk, which we venture to believe would receive very strong support from the medical profession. Experience in the United States may be called upon to justify the truth of this prediction.

The evidence at present available affords no support to the statement still frequently made that pasteurisation seriously diminishes the nutritive value of the milk. The expression of opinion in the Report of the Medical Research Council for the year 1932–1933 amply bears out this conclusion.

There are strong grounds for believing that the adequate pasteurisation of all liquid milk intended for human consumption in this country would abolish the yearly toll of disease and death due to milk-borne infection, and we can see no reason why steps should not be taken to hasten the achievement of this highly desirable result.

OUTLINE OF A MILK POLICY BASED ON SCIENTIFIC PRINCIPLES

The purpose of this memorandum is to offer constructive criticism, and we therefore submit the following proposals outlining a policy which might obtain the support of medical, veterinary, and agricultural interests.

(1) *Stimulation of clean milk production.*—Experience has shown that the production of milk free from dirt and excessive numbers of micro-organisms is possible if a few essentials are adhered to, such as washing of the milker's hands, washing of the cow's udder, and, most important of all, sterilisation of milking utensils. The carrying out of these measures is largely provided for in the Milk and Dairies Order, 1926, and enforcement of this Order would necessarily result in a considerable improvement in the cleanliness of the milk-supply. We would emphasise that dirty milk cannot be made clean by pasteurisation, and that only with milk produced under cleanly conditions is it possible to obtain a satisfactory pasteurised product.

(2) *Permissive powers of compulsory pasteurisation* should be given to towns of 10,000 inhabitants and over. The adequate supervision of pasteurising plants by the local authority should be made obligatory, so as to justify the confidence that the public places in pasteurised milk. Consideration should be given to the possible use of small pasteurising plants by producers in rural districts. All raw milk that cannot be adequately pasteurised should be boiled for use.

(3) *Establishment of a pre-pasteurisation standard of cleanliness.*—It is often urged that pasteurisation diminishes the incentive to produce clean milk. This, we maintain, is unjustifiable. A clean milk is almost as desirable as a safe milk, and the aim for which we must all work is a milk produced under cleanly conditions from healthy animals rendered safe by pasteurisation and distributed in sterilised bottles. A pre-pasteurisation standard of cleanliness, to which all milks intended for pasteurisation must conform, would stimulate enormously the production of clean milk. Such a standard, we believe, is quite possible to set up, and provided it is interpreted liberally in the early stages of its operation, no undue hardship should result.

(4) *Alteration and simplification of the present grading system, with permissive powers of pasteurisation of milk from tuberculin-tested herds.*—We do not propose to suggest new designations at the moment, since they will need a considerable amount of discussion. We do wish, however, to suggest that permissive powers of pasteurisation of milk from tuberculin-tested herds will stimulate enormously the establishment of this type of herd, and will aid the veterinary profession in its campaign against bovine tuberculosis. Pasteurised tuberculin-tested milk will be the cleanest and safest milk on the market; its retail price should not be more than 2*d.* a quart dearer than ordinary pasteurised milk; and it is likely to receive strong recommendation from the medical profession

(5) While in thorough agreement with the desire of the Government to clean up the milking herds of

the country, we feel that nothing short of the *establishment of tuberculin-tested herds* on lines similar in principle to those that have proved so successful in the United States of America is worth serious contemplation. Though clinical inspection and bacteriological sampling of the milk may eliminate a certain number of animals with obvious disease, they can have little ultimate effect on the extent of infection, since animals with clinically detectable disease constitute only a fraction of the total number infected with the tubercle bacillus. They do not accomplish the eradication of tuberculosis, nor do they provide a sufficient guarantee of safety for the milk-supply to justify its increased consumption. We therefore favour a plan, based at first on voluntary coöperation, for the gradual establishment of tuberculin-tested herds, and for the paying of a premium on the milk from such herds whether intended for pasteurisation or not.

(6) We urge that the £750,000 promised for improving the purity of the milk-supply, and of the £500,000 for propaganda purposes, should be devoted to furthering the suggestions laid down in this memorandum rather than on the proposals at present contemplated by the Government.

(7) We further urge that before any definite legislation is introduced, a committee should be appointed consisting of representatives of the producing and distributing interests, and of the Ministries of Health and Agriculture, together with independent scientific authorities, to draw up a plan for the immediate improvement in the cleanliness and safety of the milk-supply of Great Britain. We believe that very striking results might be achieved in a short time at comparatively slight cost if only agreement on fundamental principles was reached. The provision of a clean safe milk-supply is possible only if medical, veterinary, and agricultural interests are united in the support of a plan based on scientific knowledge. The time seems to us to be ripe for the translation of scientific knowledge into current practice.

A Deputation to the Ministers

On March 27th Sir Hilton Young (Minister of Health) and Mr. Walter Elliot, M.B. (Minister of Agriculture), received a deputation introduced by Sir Austen Chamberlain as chairman of the governing body of the London School of Hygiene. The members were Prof. Wilson, Dr. Arkwright, Prof. Ledingham, Dr. Minett, Prof. Raistrick, and Dr. Wright, and their object was to urge the valency of the views set out in their memorandum. In reply the Ministers stated that the points raised were under examination by the Cattle Diseases Committee of the Economic Advisory Council, and the report of the committee and the views of the deputation would receive the careful consideration of the Government. The legislation about to be introduced would be in general terms, and would permit full consideration to be given at a later stage to the matters under discussion.

HOSPITAL COSTS.—Last year the average total cost of each of 2309 in-patients at Worcester Infirmary was £7 10*s.*, as compared with £6 10*s.* in 1932. The average cost per occupied bed was £136 9*s.* 9*d.*, as against £129 18*s.* 10*d.* in the previous year. Each out-patient cost 10*s.* 5¾*d.*, a fractional fall.—At the Chelmsford and Essex Hospital last year in-patients (1877) cost £3 5*s.* 7½*d.* each per week, an increase of 9*s.* 6*d.* per patient; the explanation of the rise was that there were 132 fewer in-patients.—At Croydon General Hospital 2576 in-patients (daily average 116; average stay 16·5 days) cost £6 16*s.* 7*d.* on the average.

HOOKWORM ANÆMIA: ACUTE AND CHRONIC

ACUTE ankylostomiasis is an entity which has been too little studied, and it is useful to have the observations now reported by B. K. Ashford and G. C. and F. K. Payne.[1] The outbreak they describe was in Porto Rico and concerned seven previously healthy persons, of whom six bathed in the sea at a spot where a muddy infective stream was discharging flood water. The whole of those parts of their bodies under their bathing suits became covered with intensely irritating "bites," and acute illness set in with fever, rawness of the throat making swallowing difficult, epigastric pain and vomiting, diarrhœa, intestinal hæmorrhage, and rapidly developing asthenia and pallor. In the most serious case typhoid with hæmorrhage but with delayed agglutination had been diagnosed, but Colonel Ashford was satisfied that he was faced by acute ankylostomiasis, a diagnosis justified by the first appearance of the eggs in the fæces a few days later. Noteworthy is the presence of fever which, it appears, has also been demonstrated as a feature to be expected in acute Mansonian schistosomiasis in Porto Rico. In every case blood, patent or occult, was found in the fæces, and in the most serious of them the loss was so great that the patient's life was only saved by two blood transfusions. The throat symptoms were evidently due to the presence of larvæ there during their well-known passage from skin to intestine. On the digestive symptoms light has been thrown by J. Stewart,[2] whose experience is that heavy nematode infections lessen protein digestion, while from the worms themselves can be extracted a body (he terms it nezyme) which in-vitro experiments show to inhibit the action of pepsin; the effects on intestinal digestion will doubtless be investigated later.

These cases, as well as that of a seventh child who had not bathed but had delved with her hands in the mud bordering the infected stream, were followed by Ashford through daily, and later less frequent, blood examinations for a year; and by the Paynes through examinations of all stools for a month and afterwards on all occasions of anthelmintic treatment, these examinations being so minute as to recover young worms only 1·8 mm. long. Although all but the child bathed for about the same period and appeared to have been about equally peppered with "bites," it is significant that the number of worms recovered varied from 21 to 1439, and from the delving child 7 only. The blood changes were remarkable: a leucocytosis, preponderatingly eosinophilic, reaching its maximum three to four months after infection, the eosinophils in the last case comprising 90 per cent. of all leucocytes. The explanation offered for this striking condition is that it was due to strayed larvæ surviving in numbers in the tissues for that period and then mostly dying, an explanation which though merely inferential at present will have to be in the mental foreground in future work. At all events the fact that such close and skilled fæcal examinations disclosed only 7 worms in one whose hæmoglobin fell to 60 per cent. and erythrocytes to 3,824,000 should give pause to those who hold that 25 intestinal hookworms constitute a negligible load.

As to the cause of the anæmia, the presence and influence of blood loss were unquestionable in these acute cases. But that it wholly explains that of chronic hookworm infection is questioned by C. D.

de Langen.[3] He points out that fæcal blood cannot always be demonstrated, though in general the reaction is such as would have been produced by taking 2 to 3 c.cm. of blood by mouth; and again that the abstraction of one thirty-fifth of a sheep's blood weekly for four years left it in prime condition with a normal blood picture. Nor is increased hæmolysis a sufficient cause, for his experience in this condition is one of lessened fragility of red corpuscles and therefore lessened hæmolysis. The root cause lies in aplasia, and in its production de Langen urges the effects of diet, and in particular implicates the lipoids, cholesterin and the phosphatid lecithin; essentially he uses Miyagawa's theory of autoregulation—namely, that the intravascular death of an erythrocyte provides to the bone-marrow the most important stimulus for the formation of a new one.

The young erythrocyte contains cholesterin which prevents hæmolysis, but as it circulates in the blood it slowly adsorbs lecithin and this, or the higher unsaturated linolenic acid, brings about hæmolysis. There is normally a balance between the two substances, but when adsorption of lecithin reaches a certain level the corpuscle disrupts, and bodies so set free activate the marrow. Thus on a lecithin-rich diet of oats the serum of rabbits may be pink from hæmolysis but the numbers of red corpuscles do not fall; and in a bled rabbit erythrocytes increase, with reticulocytosis, more rapidly on a lecithin-rich diet than in one poor in that substance. This implies that within limits the hæmolysis of erythrocytes within the circulation is the best stimulus to the red marrow to produce more, though, as experiments show, this spurring may be overdone. Moreover in a heavy hookworm infection a considerable area of intestinal epithelium is sucked off, and it appears that it is absorption of lipoids which is first affected by this change.

It is on this basis that de Langen explains the effects of diet in producing hookworm anæmia in Java. It is rife amongst the poorest whose food is frugal with preponderance of carbohydrates, little protein and that vegetable, and fats and lipoids mainly vegetable and of subordinate value. Hæmolysis is thereby lessened, and a daily small loss of blood which would readily be made good by a well-nourished bone-marrow becomes the proverbial last straw. It is, however, noteworthy that, although in malaria hæmolysis occurs within the circulation, in hookworm infection (as has been mentioned) there is less intravascular destruction of red corpuscles than normal, so that their disruption can hardly act directly as a marrow stimulant; nor indeed is their iron stored within the body for the building of new ones. Ashford, too, is sure that in Porto Rico diet is important—that, speaking generally, a diet deficient in protein (in preventive advice he specially mentions animal protein) is a main factor in causing hookworm anæmia, in checking the marrow in its efforts to make good the loss of erythrocytes caused by blood sucking. Dietary defect does not, however, apply to the acute cases he reported which occurred among cultured whites; yet these persons were all still anæmic a year after infection in spite of their economic advantages. But it needs note that none of them had been completely freed from infection even after three to eight treatments with hexylresorcinol and carbon tetrachloride. That such slight infection cannot be disregarded as causing persistence of anæmia the recent report from Syria shows.[4]

In the marrow itself the plastic reaction has its various stages,[5] and at one or more of them the overtaxed marrow evidently ceased to function in the Porto Rican cases. This key position held by the marrow in combating hookworm anæmia has of course long been known; an importance of these investigations is that they throw some further light on the steps of the essential mechanism. This small epidemic is also noteworthy in that infection took place in the sea. It has been known since the opening of the century that the newly hatched hookworm larva is rapidly killed in a salt solution of sea-water strength, so that from fæces deposited in the sea the infection can hardly be carried; but less stress has probably been laid on the observation, known for nearly as long, that infective larvæ have survived in such a solution for a month, so that, as now unhappily demonstrated, a most severe infection can be acquired in the sea when infective larvæ are washed into it and have some such purchase for penetration of the skin as is afforded by a bathing suit.

Ashford's minute investigations were carried out in the face of crippling disability, and the equally exact ones of the Paynes were done with stools often disgustingly offensive from putrefying blood. But their devoted labours have outlined a clinical entity, and their stimulating suggestion as to the effects of strayed larvæ is one which is sure to be further tested. Moreover, their and de Langen's work must weigh heavily against the curiously persistent legend that the gravity of an individual hookworm infection depends solely on the intestinal load, with the victim's body as a passive nonentity.

REFERENCES

1. Puerto Rico Jour. Pub. Health and Trop. Med., 1933, ix., 97.
2. Third Report Univ. Cambridge Inst. Animal Path. for 1932–33, pp. 58 and 77.
3. Proc. Roy. Soc. Med., 1933, xxvi., 763.
4. See THE LANCET, 1932, ii., 588.
5. Med. Research Council Ann. Rep. for 1932–33, p. 16; see THE LANCET, March 10th, 1934, p. 535.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

Surg. Lts. (D) to be Surg. Lt.-Comdrs. (D): P. S. Turner, T. G. à C. Emberson, and A. A. Gardner.

The following appointments are notified: Surg. Comdr. W. Gemmell to *Pembroke* for R.N.B.

Surg. Lt.-Comdrs. W. A. Hopkins to *Orion*; S. G. Weldon to *St. Angelo*, and as Naval Health Officer, temp.; and D. A. Newberry to *President* for three months' course.

Surg. Lt. W. D. Gunn to *Victory* and to *London* on recommg.

Surg. Comdr. C. G. Sprague to *Cyclops*.

ROYAL ARMY MEDICAL CORPS

Rex St. John Lyburn to be Lt.

ARMY RESERVE OF OFFICERS

The undermentioned having attained the age limit of liability to recall, ceases to belong to the Res. of Off.: Major P. S. Stewart.

TERRITORIAL ARMY

P. R. Goodfellow (late Cadet Corpl., Clifton Coll. Contgt., Jun. Div., O.T.C.) to be Lt.

INDIAN MEDICAL SERVICE

Majs. N. D. Puri and J. B. Vaidya to be Lt.-Cols.

Capt. E. V. Claydon retires, receiving a gratuity.

Lt.-Col. N. M. Wilson to be Col.

Pritam Varialsingh Karamchandani to be Capt. (on prob.).

ROYAL AIR FORCE

Dental Branch.—Flight Lt. A. P. Atkins is transferred to the Reserve, class D (i).

PANEL AND CONTRACT PRACTICE

The Increase of Canvassing

THERE seems little doubt that the practice of canvassing for patients is on the increase, although it might be hard to ascertain how much of it is due to the difficulty felt by many practitioners to make ends meet, and how much to the lack of ethical training in the curriculum. The General Medical Council has laid down that canvassing is contrary to the public interest and complaints are considered by the Council in this light when brought to their notice. Reference to the index to the Council's minutes will give some idea of its prevalence. It is, however, open to any practitioner who has what he considers sufficient evidence of this practice to lay a complaint before his panel committee. The ethical subcommittee will consider the complaint, and invite the complainant and the doctor against whom he makes the complaint to appear before them to give evidence, upon which they will arrive at a conclusion as to whether the complaint is substantiated or not.

The course to follow in the event of the complaint being substantiated was the subject of debate in the London panel committee at its last meeting. The complaint of canvassing made by Dr. A against Dr. B was found to be proved. It was decided eventually to make representations to the Minister of Health that Dr. B's conduct had been prejudicial to the Service and that he should be removed from the panel. This decision means that the whole case will be tried again de novo by officials of the Ministry when the panel committee will be required to prove that Dr. B did canvass the patients of Dr. A, and both sides are entitled to legal assistance. The case is therefore sub judice, but the facts submitted to the committee may be briefly set out. The practice of Dr. A was originally in the possession of Dr. B. He sold this practice to another practitioner, Dr. C, in October, 1931. Part of the purchase price was paid in cash and a substantial balance was payable by quarterly instalments. Owing to Dr. C borrowing the whole or the bulk of the purchase price, Dr. B has stated that he was not permitted to have any security on the practice. Dr. C defaulted and went bankrupt. The lease of the house which belongs to Dr. B was disclaimed by Dr. C's trustee in bankruptcy, and when the mortgagees sold the practice to a further practitioner Dr. D, the house next door was taken at a lower rent and the practice transferred there. Dr. D in due course sold the practice to Dr. A. This was in September, 1933. On May 9th, 1933, Dr. B returned to his original address to practice, as the usual clause with regard to the restriction of practice was no longer enforceable through the default of Dr. C. Dr. A contended that Dr. B canvassed insured persons on his list to transfer to him. He supported his contention by signed statements from six insured persons. The hearing of this case occupied the committee three days.

This is the first occasion in London that the panel committee has made such representation. There was one previous case of a serious complaint which was tried before the whole committee, counsel being present for both sides conducting the case. But a court of 80 members is too cumbersome, and such cases are now dealt with by the ethical subcommittee. The question naturally arises as to whether it is good policy for the panel committee to act the policeman and conduct a complaint before the Ministry against a practitioner. An amendment was moved that the case should be sent to the medical service subcommittee for investigation, but this was lost by a small majority. The panel committee has no power to call witnesses, and its only penalties are (1) a letter of censure which may be mild or severe; (2) representation to the Ministry for removal from the panel; (3) to send the case to the General Medical Council. The opinion of the minority was that the medical service subcommittee being a statutory judicial body competent to call witnesses and pay their expenses would be better able to present a case to the Ministry than would the panel committee, which would certainly require to employ and pay for legal assistance. The majority however—amongst whom were several who had spent much time on the case in subcommittee—thought the panel committee should have the courage of their convictions, and should not put on other shoulders work they had the power to do themselves.

An Ethical Committee in Search of Truth

The ethical subcommittee of an important panel committee recently had under consideration a complaint made by one practitioner (Dr. A) against another (Dr. B) alleging that he influenced an insured person formerly on his (Dr. A's) list to transfer to him. Dr. A submitted a signed statement from the insured person in question (Miss V) to the following effect:

> "In the summer of 1932 I went round to Dr. B's surgery for medical attention for a friend of mine. Among other questions Dr. B asked me who my doctor was. I told him that Dr. A was my doctor. He then asked me whether I liked Dr. A or not. I told him that I liked him as a doctor. He then asked me if I would like to come on his register. I did not really wish to go on his register so I said I would think it over. I went round several times for medicine for my friend, and he asked me again if I had thought it over. My friend told me he was treating her quite well so I let him have the panel cards of my father and myself. Neither of us signed any letter expressing any desire to change our panel doctors."

Dr. B denied the allegation and submitted a signed statement from Miss V stating that he did not influence her in any way to transfer to him. Both practitioners attended before the ethical committee to submit their observations. Miss V also attended with her mother, apparently at the request of both Drs. A and B. On cross-examination Miss V stated that the statement submitted by Dr. A and signed by herself was quite untrue, and she had done Dr. B an injustice. The report continues: As far as could be gathered from a person of Miss V's temperament, a highly neurotic type, what had transpired was as follows:

> Miss V was originally on Dr. A's list until the end of 1932. She accompanied a friend who was staying at her home to Dr. B's surgery. This friend, who was highly satisfied with the treatment which she was receiving from Dr. B, eventually persuaded Miss V and other members of her family to transfer to Dr. B's list. Miss V, to use her own words, "turned huffy with Dr. B about a whitlow on my thumb," and went to Dr. A in January last with a view to transferring back to him. She states that the statement which she then signed, and which has been quoted in the foregoing, was written by Dr. A, and read over to her by him. He then asked her to read it, which she did, but contends that she did not really understand its purport. She signed the statement because she was sorry for Dr. A, who had told her that his practice was declining. She was averse to signing it, but Dr. A had pressed her to do so. She gave way because she thought she would be doing him a good turn, and that the matter would not go beyond Dr. A seeing Dr. B.

Having considered Miss V's evidence and the observations of the two practitioners, the committee decided to take no further action.

CORRESPONDENCE

THE CAUSAL FALLACY

To the Editor of THE LANCET

SIR,—It is not easy to be sure whether Dr. Graham Howe merely wishes us to have some exercise in the field of philosophy, or whether he is seeking to help us in our daily work by giving us more easily used concepts than those by which, as he fears, we are now being hampered. If it is only the former it is, of course, great fun; but if, as I suspect, he has intended to show us a path, then I regret to say that I find him an obscure teacher, and I should be glad if he could clarify many passages in his discourse.

At one place, for example, he describes time as an aspect of matter, but before that he had been insisting that it was a fourth dimension of space, which looks as if time was an aspect of space. If time is also an aspect of matter is space one, too? All this seems very confusing. When he is talking about the space-time continuum Dr. Howe seems to imply that doctors have neglected the time factor in their work.

"... the time concept has not yet displaced the causal concept in medical orthodoxy. Whether it be in mind or body, the material of our observation is thus four dimensional and time must be recognised as being quite as important as the three geometrical dimensions in space,"

which is, I think, what every doctor does recognise, though not in such grandiloquent language.

I wonder too whether the notion of the space-time continuum is really helpful outside of mathematical physics; whether indeed in non-mathematical thinking it has any meaning at all; whether the constant repetition of the phrase to which we have all been subjected for some years has not induced in us a feeling that it has meaning, when really it has none when used in word language as opposed to mathematical language; whether it is not one of those pseudo ideas which Herbert Spencer warned us against 50 years ago. We are all familiar with the people who think they are expressing an idea when they talk of inferiority complex, and who are dumb if you ask them what they mean by complex. Further, the idea has little relevance to the subject of Dr. Howe's paper, which, so far as I can follow it, has reference to the contrast between thinking of the cause of a thing on the one hand, and the conditions in which things occur on the other. Let us take another example.

"... the causal concept allowed us to understand nothing whatever about force, and in fact has utterly obscured the whole problem so as to make it practically non-existent."

How a concept which failed to make us understand a problem could annihilate that problem I cannot conceive. Apart from this difficulty, is the first part of the statement true? Surely the concept of force arose from certain effects which suggested the need of a cause. The idea of force would never have arisen at all save for the causal concept. Again:

"... the satisfaction of the physician at his patient's recovery may well feel inclined to assume the generous reward of having been the cause through the skill of his remedies."

Probably these last two quotations are merely careless writing and Dr. Howe could probably say easily enough what he does mean; but philosophy is hard enough to understand when it is written about clearly and carefully, and careless framing of sentences in so important a paper is blameworthy. The sentences chosen by no means exhaust the list of the avoidable obscurities in the article.

But, apart from all this, is the concept of causation really so very damaging as Dr. Howe makes out? He suggests that physicians are constantly seeking first causes. I am sure that they are doing nothing of the kind. They are constantly and properly seeking causes, not a cause, which are sufficient for their *purpose*. Every physician is enough of a philosopher to be well aware that the first cause is unknowable, *that the idea of causation* is extremely difficult to understand, but that there are important things the alteration of which will help his patient to get better. Thus he is called to see someone with fever, abdominal pain, rigidity, and a history of vomiting. He opens the abdomen, finds an inflamed appendix, says very properly that this was the cause of the symptoms and knows that its removal will be followed by their relief. It is the merest pedantry to quarrel with him for thinking he has dealt with the essential cause, a thing he most certainly has done; it is of no help to him to think of the matter in terms of endless chains of sequences one of which included a microbe and the other an appendix; and it is certainly not new thought to consider that there had been an alteration of balance between the resistance of the host and the virulence of the microbe. That was old history when I was a medical student.

So much, however, when it comes down to brass tacks, is Dr. Howe dependent on the theory of causation that when he is attacking Sir Maurice Craig on the subject of insomnia he says: "Insomnia, on the other hand, is said to be *caused* (my italics) by pain or worry, or mental restlessness, with or without the existence of some real external agent; of any of these it may be an *effect*, and it is the *antecedent cause*, whatever that may be, which then requires treatment."

Yet elsewhere we are told that "cause is but a phantasy." I am, Sir, yours faithfully,

T. A. ROSS.

Cassel Hospital for Functional Nervous Disorders,
Swaylands, Kent, March 29th.

To the Editor of THE LANCET

SIR,—I am comforted in noting that Dr. Graham Howe, though superior to "causes" in his pathology, is not above "effecting" a restoration of balance by treatment. Effects, in Dr. Howe's hands, have good old-fashioned causes covered with a modern coat of paint in the words "dynamic balance." Hypotheses built cautiously from experience surely must not be damned simply because "causally" tainted. Need we be so careful of our metaphysics? I continue, in spite of the mathematicians (and in their company) to be borne along, a 3-dimensional earthly animal, down an obstinately "one-way" time alley, and the compulsion of flesh and blood seems to me (and to them in their more carnal moments) to be a continual stream of causes and effects. I venture to outrage Dr. Howe's feelings by suggesting that the characters of the universe, even in its present highly delectable and 4-dimensional state, are a "brain-wave," and consequently a *remote and curious effect* of certain mammalian prehensile and phonetic developments.

A hundred years ago Schopenhauer wrote:—

"Philosophers . . . gaily philosophised up in the air until at last Hegelian sophistry (Afterweisheit) reached the happy elevation of denying any parentage to our concepts, and asserting that these concepts are the foundation of all reality."

I wish I knew what Dr. Howe means by "mind-body balance."—I am, Sir, yours faithfully,

Oxford March 28th. H. A. ROBERTSON, M.R.C.P.

MONOCYTOSIS AND GRANULOPENIA

To the Editor of THE LANCET

SIR,—I was interested to read Dr. Hartfall's description of a case of monocytosis and granulopenia with an infection of the gums by Vincent's organisms. In the January issue of the *Archives of Internal Medicine* Forkner describes six cases of acute monocytic leukæmia, with the monocytes in the region of 100,000 per c.mm., and the granulocytes almost down to vanishing point. Four out of these six cases had a Vincent's infection of the gums and pharynx. This certainly looks more than coincidence. Forkner does not appear to have attached any importance to the neutropenia; none of the cases was given nucleotide, and they all died.

I am, Sir, yours faithfully,
Hoveden-road, N.W., March 27th. E. HINDEN.

To the Editor of THE LANCET

SIR,—My enjoyment in reading Dr. Hartfall's paper (THE LANCET, March 24th, p. 620) was a little discounted by my introduction to the term "agranulopenia." Hæmatological nomenclature is already much encumbered by redundant terms and nowhere is this more evident than in conditions in which the granular leucocytes of the circulating blood are diminished. In 1922 Werner Schultz described a condition which he called "angina agranulocytica"; Friedemann, recognising that angina was not constantly present in this syndrome, suggested "agranulocytosis." Since that time the following synonyms have appeared: granulocytopenia, granulopenia (Harkins); malignant neutropenia (Schilling); the neutropenic state (Doan); agranulæmia (Brookes); and granulophthisis (Lescher and Hubble).

This confusion is increased by the fact that, prior to 1922, Schilling had used the term "agranulocyte" to describe an immature cell of the granular class in which granules had not yet appeared. Agranulocytosis is thus an ambivalent word meaning, alternatively, an increase of agranulocytes or a decrease of granulocytes. Dr. Hartfall appears to use his term "agranulopenia" as interchangeable with granulopenia. Etymologically it can, surely, only mean a decrease in agranulocytes, unless the double negative—the prefix a- and the suffix -penia—gives the word, by an unwarrantable pleonasmus, the meaning of an increase in granulocytes.

I feel, Sir, that you will agree with me that our knowledge of leucopenic states is unnecessarily obscured by what you, a few years ago, so happily termed, "Hypernomenclaturosis."

I am, Sir, yours faithfully,
Bournemouth, March 27th. RONALD BODLEY SCOTT.

MEDICINE AND THE RIGHT OF SANCTUARY

To the Editor of THE LANCET

SIR,—The letter from Mr. Somerville Hastings last week (p. 709) raises an exceedingly important question, that of the right of sanctuary of the wounded with a doctor in times of civil war. It is a subject worthy of the serious study of the historian with a sense of humanitarian and legal values. The material for such a study must be vast, and it would be necessary to make it not only country by country, but also century by century. Even if it were to be confined to one country and one century, the historian would find enough material to hand for an engrossing survey. In France, with its glowing tradition of chivalry, it is not surprising that professional secrecy for all concerned with the art of healing, nurses as well as doctors, is imposed by law. During the recent rioting in Paris, the wounded among the civilians were cared for in the public hospitals as well as at home. No complete census will ever be made of these casualties, and it is unthinkable that any official would dare to challenge the combined authority of the law and public opinion by coercive measures infringing the obligation of medical secrecy. Public opinion has a very fine tradition as well as instinct behind it in this matter, and one of the most dramatic events in the history of medicine and the right of sanctuary concerns Jean-Dominique Larrey, the heroic surgeon of the Napoleonic wars of whom Napoleon wrote in his will: "C'est l'homme le plus vertueux que j'aie connu." During the revolution of 1830, Larrey, then about 64 years old, found himself busy at the Gros-Caillou Hospital in Paris caring for the wounded. His prestige was such that, as he proceeded to his work, the rioters cleared a passage for him, and the troops concerned with the maintenance of order presented arms as he went by. One evening the rioters swept up to the Gros-Caillou Hospital in search of wounded members of the Royal Guards. Larrey ordered every door to be flung open, and as the rioters surged forward he faced them squarely with: "Que voulez-vous? Mes blessés? Ils sont à moi, allez-vous-en!" And they did.

I am, Sir, yours faithfully,
April 2nd. YOUR PARIS CORRESPONDENT.

To the Editor of THE LANCET

SIR,—The political crisis has affected Austrian practitioners in many ways. All Viennese doctors connected with the Schutzbund (the socialist armed force) are in prison, and doctors attending wounded socialists are liable to be imprisoned unless they notify the police of the names and addresses of the patients.

With regard to the position of Jewish doctors, in August 1932 I found that Jewish practitioners had been excluded from the staff of the Kinderklinik, while all Viennese doctors have to fill in papers giving their nationality and religion, and the dates since which both have been held. Jewish medical men are being removed from their existing hospital appointments in many parts of Austria.

Those of us who have seen the excellent public health services in Vienna—housing schemes, day nurseries, swimming baths, and children's hostels—must especially deplore that the chief promoter of all these measures, Prof. Julius Tandler, is now in prison. He returned from safety in Czechoslovakia to Vienna knowing the fate that was in store for him.

I am, Sir, yours faithfully,
Eastdean, April 2nd. STELLA CHURCHILL.

THE THEORY OF VISION

To the Editor of THE LANCET

SIR,—Though all are agreed that the cones of the retina are the percipient elements, no one has shown how the transparent colourless cones can be directly stimulated by light or form a basis for colour perception. Direct stimulation does not agree with the laws of photo-chemistry. According to Grotthus's law no effect can be produced by light unless it is absorbed. Stimulation of the cones, therefore, must be indirect and all the facts point to the view that it takes place through the photo-chemical decomposition of the visual purple.

I am, Sir, yours faithfully,
F. W. EDRIDGE-GREEN.
Board of Trade, S.W., March 28th.

MENORRHAGIA CURED BY SPLENECTOMY

To the Editor of THE LANCET

SIR,—At the meeting of the North of England Obstetrical and Gynæcological Society reported in your issue of March 24th (p. 632) Mr. Carlton Oldfield described the case of a woman, aged 25, who suffered from menorrhagia for three years, with resulting anæmia, and was cured by splenectomy performed by Lord Moyniham. The case was probably one of essential thrombocytopenic purpura hæmorrhagica, although, it was stated, there had never been a purpuric rash or bleeding from other mucous membranes. The low platelet count and prolonged bleeding time, together with the excellent effect of splenectomy, which was followed by the large increase of platelets and a return of normal bleeding time, are most suggestive. The patient remains in perfect health nine months after the operation and menstruation has become normal.

This case reminds me of one I published in the *Proceedings of the Royal Society of Medicine* (clinical section) eight years ago.

A woman, aged 28. suffered from very severe menorrhagia which necessitated her frequent admission to hospital. In one instance the bleeding had continued for several weeks and her red cells had fallen to just over two million. The thrombocytes were almost absent, the bleeding time 15 minutes, and the capillary resistance test strongly positive. The spleen was not palpable. Her temperature went up to 104° F. Nothing proved of any use except blood transfusion. After her full recovery I asked my colleague, Mr. Rodney Maingot, to perform splenectomy at the Royal Waterloo Hospital, and within a few days the thrombocytes had increased to over a hundred thousand, the bleeding time became normal, and the capillary resistance test negative. As a matter of fact, the bleeding time became normal shortly after the operation. Splenectomy was performed eight years ago and menstruation has been normal ever since, while her general condition is excellent, indeed she now enjoys robust health.

I am not at all surprised to learn that in Mr. Oldfield's case "the bleeding time became normal immediately after operation"; for in two of my own cases of essential purpura hæmorrhagica, in which there had been bleeding from the gums and nose for weeks without treatment availing, the loss of blood ceased within a few minutes of the splenic vessels being tied.

I am, Sir, yours faithfully,

April 2nd. BERNARD MYERS, M.D., F.R.C.P.

DUST FROM TARRED ROADS

To the Editor of THE LANCET

SIR,—I am instructed by my association to draw your attention to the title to Dr. Campbell's note on p. 233 of your issue for Feb. 3rd.

The substance of the note does not lead to the inevitable conclusion that cancer will arise from the action of dust from tarred roads; yet there is a great danger that readers seeing the title, "Note on the experimental production of cancer by dust obtained from tarred roads," will be led to believe, unless they examine the subsequent reading matter critically, that the dust from tarred roads is responsible for cancer in human beings, and this may cause much unnecessary prejudice against roads treated with British tar.—I am, Sir, yours faithfully,

R. MURDIN DRAKE,
For General Manager, The Association of British Chemical Manufacturers.

166, Piccadilly, W., March 23rd.

PARIS

(FROM OUR OWN CORRESPONDENT)

ENTERIC FEVER IN MARSEILLES

ACCORDING to Prof. H. Violle, the mortality from typhoid in Marseilles in 1931 was 15·7 per 100,000 inhabitants, while the corresponding figures for Paris, Berlin and London were 4·8, 0·8, and 0·5 respectively. The notification of the causes of death in Marseilles being notoriously defective, the true state of affairs in the town is assuredly even worse than the official returns suggest. Little wonder, therefore, that the last annual meeting of the Medical Society of Marseilles was devoted to this subject, and that it was discussed on three different dates (Feb. 15th, 21st, and 28th). The heads of Prof. Violle's indictment were several: lack of sewers in parts of the town and its suburbs; chlorination of drinking water in the central area only; pollution of the coast line aggravated by the tideless state of the Mediterranean; and consequent infection of shellfish. Prof. D. Olmer stated that about 98 per cent. of the enteric fever in Marseilles was due to the typhoid bacillus, only 1·4 per cent. being due to paratyphoid B, and 0·2 per cent. to paratyphoid A. According to the same authority, the effect of inoculation against the disease is reflected in the relatively high morbidity and mortality in women, few of whom have enjoyed its benefits. He has not only found shell-fish responsible for an imposing proportion of cases, but has also learnt to regard typhoid of such origin as more serious than typhoid contracted in some other way (mortalities of 21 and 12 per cent. respectively). Shell-fish typhoid has a comparatively short incubation period; there is a preliminary stage of slight gastro-intestinal upset with or without jaundice; diarrhœa, hæmorrhages, and perforation are common; and the various stages of the illness tend to run into one another as if the rhythm were accelerated. Its severity may be attributed either to massive infection or to coincident infection—by *B. coli*, for example. With regard to treatment, Prof. C. Mattei and Dr. Isemein recommended Rodet's specific serum, which they say is always harmless and often effective even in desperate cases. Other speakers discussed the value of bacteriophage and found it doubtful. A more favourable opinion was expressed of the transfusion of the blood of a healthy person recently inoculated against typhoid and paratyphoid fever. With regard to preventive measures, typhoid inoculation by subcutaneous injection emerged from the discussion with commendation, whereas Besredka's method of oral immunisation was dismissed as uncertain, as being effective only for a few weeks, and as giving a false sense of security.

THE PHYSICIAN ATTENDS ON HIMSELF

A correspondent in *Concours Médical* for March 18th seeks advice. A war pensioner suffering from pulmonary disease, he has been in the habit of signing his own prescriptions, and was proceeding blithely in this course when a colleague told him that such autotherapy was against the regulations. The legal adviser to *Concours Médical*, Dr. Boudin, reassures him. It appears that according to a law of 1919 every war pensioner is entitled to choose his own doctor; how then could those who administer this law stultify it by discriminating against the doctor most likely to take and interest in the case? A judgment of the law courts in 1920 also rules that a properly qualified doctor is as free to use dangerous drugs for his own treatment as for that of anyone else. It seems therefore that no formal objection can be raised to the medical pensioner's prescriptions for himself, even when the chemist's bill is paid by the State. But when it comes to the charging of a fee for the medical care he renders to himself, the matter is somewhat different. The French Ministry of Pensions holds that such charges are not permissible; Dr. Boudin, on the other hand, while admitting that there is something "inelegant" about them, does not believe they are strictly illegal. There is common sense as well as a legal aspect to this problem. A prescription can be scrutinised and analysed; and there are limits to the amount of drugs that even the most receptive patients can accommodate. But medical care, with appropriate advice, is a far less tangible commodity; and the medical pensioner, free to rate the visions of his head upon his bed as consultations worthy of remuneration, might well experience some difficulty in maintaining his normal ethical "elegance" as he attempted to assess the value of abstract thought in terms of hard cash.

MARGARINE IN DISGRACE

A report by Prof. L. Hugounenq to the French Academy of Medicine on Feb. 27th dealt with margarine as a food, its dangers to health, and its inadequacy as a substitute for butter. Many of the failings of margarine are already well known, but there have previously been few indictments of it so sweeping and sustained. Its faults, he said, include a comparative lack of digestibility, a deficiency or lack of vitamins, and the absence of acids which give butter an attractive smell and taste. Butter also contains phosphorus which is not to be found in the materials from which margarine is made. In response to this report the following resolution was adopted: "The Academy, considering that certain margarines provoke digestive troubles in certain persons that these troubles are undoubtedly due to faulty conditions of manufacture and purification, that certain margarine factories elude the supervision and control provided by the law, that margarine is a substitute for butter which does not, however, contain all the elements of natural butter (vitamins and fatty acids) recommends that all undertakings, without distinction, which deal with animal fats intended for food, should be under supervision and inspection and subject to full legal control in the interests of public health."

OBITUARY

DAVID LEES, M.B., Ch.B., F.R.C.S. Edin., D.S.O.

We regret to record the death of Dr. David Lees, surgeon to the Royal Infirmary, Edinburgh, which occurred on March 25th after an operation, in his fifty-fourth year.

David Lees was born in Tarbolton, the son of Mr. Robert Lees, of Lagg, a veterinary surgeon, and was educated at the Ayr Academy and at the University of Edinburgh. He graduated as M.B., B.Ch. in 1907, and was a distinguished student, becoming later resident house surgeon at the Royal Infirmary and house physician at the Royal Maternity Hospital, Edinburgh. He was for a time assistant medical officer at the Bangour Mental Hospital, and then for four years served in France with various units, being several times mentioned in despatches and obtaining the D.S.O. in 1917. In 1918 he obtained the diploma of F.R.C.S. Edin., and was elected surgeon to the Royal Infirmary, and consulting surgeon for veneral diseases to the Royal Maternity Hospital. Of these diseases he made a particular study, his advice being sought in many directions; he was, for example, delegate of the British Social Hygiene Council to Cyprus and to India during 1926–27, with the responsibility of advising various governments on systematic methods of dealing with venereal disease. He had already written largely and practically on the subject, producing papers on vaccine therapy in gonorrhœa, and writing the article on the Vesiculæ Seminales in the Encyclopædia Medica; and in 1927 his book entitled "Practical Methods in Diagnosis and Treatment of Venereal Diseases" went speedily through two editions. This book brought together in readable form the latest ideas and the most recent technique. Some of the plates should have historic value, as they picture syphilitic rashes of which the present-day student sees little owing to effective therapy. And Lees's wide personal experience enabled him to make useful generalisations about various kinds of therapeutic measures. At the B.M.A. meeting of 1927 he recorded observations on 6000 cases of syphilis treated with bismuth, and recorded his own opinion that, valuable as it was for its ease and safety of administration when organic disease was present, bismuth should always be combined with arsenic, except possibly in pregnancy. Brought in contact in the Edinburgh clinic with a highly floating population Lees was early and strongly impressed with the need to follow up the treatment of venereal disease to a successful conclusion if public health was to be efficiently served. He was prominently associated with the compulsory measures embodied a few years ago in the Edinburgh Corporation Bill, believing that, without some kind of assurance of continuous treatment, many sufferers from venereal diseases would neither be cured themselves nor be prevented from remaining a danger to the community.

Lees was a good teacher, emphatic and picturesque, speaking with conviction of things of which he had personal knowledge, and how valuable his services were at the Edinburgh Infirmary is well set out in the following estimate from a distinguished colleague:—"There are certain people who occupy positions which are peculiar and unique because they have created them themselves. David Lees was such an one. His dynamic personality, combined with his obvious sincerity, enabled him to get things done according to his own well-considered plans. His department could not be thought of apart from himself as it was the expression of his character and his energy. His broad interest in medicine made his opinion on all matters connected with his specialty of peculiar value, and his medical and surgical colleagues availed themselves freely of his ever-ready help. Whilst clear-headed and dogmatic in his views, he was singularly free from all conceit, and a saving sense of humour preserved harmony whenever a clash of opinions threatened discord. His interests were widespread; a keen sportsman he took an active part in the athletic side of university life. As secretary of the Medico-Sociological Club he was the moving spirit in promoting discussions on broad public questions in their relation to medicine. It is, however, as an enthusiastic, helpful, and loyal colleague that he will be missed the most by his medical associates in Edinburgh. He had made such a bold and characteristic niche for himself that it is difficult to see how it can be filled. He has left us a very vivid picture of how a man of character and personality may create for himself and his specialty a position of undisputed authority and importance."—*D. P. D. W.*

Another personal friend adds to the picture with these words :—"David Lees had a robust personality; opposition did not damp but rather stimulated him to renewed attempts to carry his point. His arguments were not inspired by a subtle diplomacy but by confidence that logic demanded the acceptance of the conclusions to be drawn from the available evidence. If any were irritated by this attitude, they were forced to respect the man, and his influence in the development of his specialty was indubitable, even though he failed to carry through one project which he had most at heart, the making in Scotland of venereal diseases notifiable. In the pursuits of his leisure David Lees presented the same almost boundless energy. A keen golfer, he was so much interested in the encouragement of golf as a game for children that he often gave up his own sport, when on holiday, to organise competitions for boys and girls. His cheerful good nature will be greatly missed at the northern golfing resorts where he spent his summers. His own son shows a remarkable aptitude for the game."

David Lees leaves a widow and one boy.

SAMUEL LODGE, M.D., B.S. Durh., O.B.E.

THE death occurred on March 19th at his residence in Harrogate of Dr. Samuel Lodge, well known in Bradford and Halifax and outside his immediate circle as a specialist in diseases of the eye and ear. He was 68 years of age.

Samuel Lodge was a native of Bradford, the son of a medical man of the same name, and received his early education at the city Grammar School. He entered St. Thomas's Hospital as a medical student and attended courses at various times at Leeds and at the University of Paris. He graduated as M.B., B.S. Durh. in 1887, and was for a time medical and surgical assistant at the Royal Infirmary, Newcastle-on-Tyne. He shortly afterwards began to specialise in the subjects in which he made his considerable name, was elected surgeon to the eye, ear, throat, and nose department of the Halifax Infirmary, and surgeon to the Bradford Royal Eye and Ear Hospital. During the war he was medical officer to the 6th Battalion of the West Yorkshire Regiment, being already a surgeon-major in the Volunteers, and did excellent organising work, receiving for his services on the Army Medical Boards in Bradford and Leeds the O.B.E. Dr. Lodge's connexion with the Halifax Infirmary extended over nearly a quarter of a century, but he had lived recently in semi-retirement. He leaves a widow and four sons, three of whom are in the medical profession, and one of whom succeeded his father at the Halifax Infirmary. Another son, who died recently, was ophthalmic surgeon to the Leeds Infirmary.

SYDNEY GUY BILLINGTON, M.B., B.S. Lond., F.R.C.S. Edin.

THE death occurred on March 17th of Dr. Sydney Guy Billington, who had undertaken much independent research in the attempt to discover biochemical remedies which might be of value in several conditions —notably, influenza and rheumatism and malignant disease. He received his education at the Birmingham medical school, took the English double qualification in 1910, and in the same year graduated at the University of London as M.B., B.S. He later acquired the diploma of F.R.C.S. Edin. He was a successful student, filled house appointments at the Queen's Hospital, Birmingham, and later became resident pathologist at the General Hospital, Birmingham, while he held the same post for a time at Wolverhampton General Hospital. For the last 17 years he was very interested in promoting the use of "Billington's Antibody," and published, in certain quarters, reports on the use of the remedy purporting to show its value in many conditions, in malignant disease among others. He was unable to obtain the support which he considered his due from members of the medical profession in regard to either his theories or his results; his industry and enthusiasm were undoubted, and certain supporters of his views consider that his work, or some of it, may yet receive more consideration than it did during his lifetime.

MENTAL AFTER-CARE ASSOCIATION

Lord Wakefield of Hythe presided at the annual meeting held on March 20th at the Haberdashers' Hall, when Mr. L. G. Brock, chairman of the Board of Control; Dr. Nathan Raw, Lord Chancellor's visitor in lunacy; Dr. Reginald Worth, chairman of the Association, and Mr. J. M. Oakey, the treasurer, spoke of the activities of a year in which 2865 had been helped. The Association boards out patients in cottage homes for a period of convalescence, arranges residence for them during attendance at clinics, gives them grants of money or relief in kind, gives maintenance while work is being found, obtains employment suitable to their abilities, supplies clothing, tools, &c., necessary for employment, and, generally speaking, acts as a personal friend with sympathy, understanding, guidance, and help. The council reported assistance rendered to many societies and hospitals which had referred difficult cases to them. During the year a large number of old patients had applied for help and advice, an encouraging feature of the work being the way in which those who had once been assisted turned to the Association in their later troubles. Help given at the right time is responsible for averting relapses and consolidating recoveries; in 1933 the Association dealt with 591 "pre-care" patients, the great majority of whom were prevented from becoming patients in a mental hospital. New developments in the Association's work include coöperation with the L.C.C. in the supervision of patients leaving its mental hospitals, and the supply to county and other authorities of social workers. The treasurer described the ratio of administration expenses to revenue as one of the lowest of any benevolent organisation in the country. The secretary of the Association is Miss Vickers, from whom particulars can be obtained at Church House, Dean's Yard, Westminster.

NEWCASTLE ROYAL INFIRMARY: ANNUAL REPORT. The Royal Victoria Infirmary, Newcastle-upon-Tyne, last year admitted 12,842 new in-patients, whose average stay was 15·8 days. This was an increase of 590. There were 110,708 out-patients. With the opening of a special new block of buildings for the treatment of orthopædic cases, and the heightening of two pavilions to add new wards, and thereby replace the two wood-constructed wards erected temporarily during the late war, 54 beds have been added to the bed strength, bringing the present complement of beds in the voluntary side of the hospital up to 645. The new orthopædic building cost £31,000. It is hoped that the additional beds will make a sensible impression upon the waiting-list of nearly 2000. There were 1108 motor traffic cases, of which 416 were admitted, involving an average daily occupation of 18 beds. The total cost was £2413, of which £444 was received from insurance companies. On an average only 30 per cent. of the accounts submitted by the hospital have been paid by the companies.

Since the beginning of this year the Royal Victoria Infirmary has benefited by five bequests of the total value of £4900.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

Easter Adjournment

ON Wednesday, March 28th, the House of Lords adjourned for the Easter recess until Wednesday, April 11th. The Royal Assent was given to a number of Acts, including the Rural Water Supplies Act, the Indian Pay (Temporary Abatements) Act, and the Mining Industry (Welfare Fund) Act.

The House of Commons adjourned on Thursday, March 29th, for the Easter recess until Monday, April 9th.

Bills Advanced

In the House of Lords on March 27th a Bill to deal with betting and lotteries was introduced and read a first time. In the House of Lords on March 28th the South Devon and East Cornwall Hospital, the Plymouth Royal Albert Hospital, and the Devonport and Central Hospital Bills were introduced and read a first time. In the House of Commons on March 28th the Birmingham United Hospital Bill was read a first time.

Poor Law (Scotland) Bill

In the House of Commons on March 27th Mr. SKELTON (Under-Secretary of State for Scotland) moved the second reading of the Poor Law (Scotland) Bill. He said that the Bill was only a step, though an indispensable step, to a full and comprehensive modern poor-law statute. The function of the present Bill was to make amendments of the law, most of which were long overdue. The Bill provided that in the case of an able-bodied unemployed man there should be an opportunity, where it seemed desirable, that proper work should be done in return for relief. It also made it possible for the poor-law authority to provide the means for training and instruction. It dealt with poor-house discipline, questions connected with discharge, and a novel feature with regard to taking to suitable institutions a certain type of aged and infirm persons. Clause 4 of the Bill provided that a local authority should, if required by the Department, provide suitable and separate poor-house accommodation for each or any of such classes of inmate as might be prescribed by regulations made by the Department. At present the Department of Health for Scotland had no powers definitely of stimulating local authorities to proceed with the work of improving the poor-houses. Modern methods and the modern point of view demanded that, where possible, there should be proper segregation in their own interests of the classes of people who composed the different types of those requiring assistance. Clause 9 provided for the removal, under full and proper safeguards, to a suitable hospital or other institution of aged and infirm, or physically incapacitated persons who were unable to devote to themselves, or to obtain from other persons, proper care and attention. The procedure would be that on a certificate by a medical officer application might be made by the relieving authority to the Sheriff, who would have to be satisfied that there was a suitable institution to which the person could go. An order could then be made, which in no case lasted for more than three months, for the removal of the aged or infirm person to a suitable institution. Clause 10 gave a new right to the poor of Scotland—namely, that the first 5*s.* of friendly society sick pay should be disregarded in the assessment of their relief. It also incorporated a provision which the Scottish poor had enjoyed up to now—namely, that the first 7*s.* 6*d.* of National Health Insurance benefit should be disregarded. It was provided that a casual poor person should not be entitled to discharge himself from a poor-house before 9 o'clock in the morning of the second day following admission. It was important that when a vagrant or casual poor person was in an institution the opportunity should be taken to cleanse them and their clothing. That was a public health duty and was beneficial to the casual or vagrant person.

Mr. MILNE said that in 1904 a departmental committee reported on the medical relief of the poor. The report stated that in one poor-house they found an inmate undergoing 12 hours' confinement in a cell that was not provided with a seat. It was absolutely dark and without ventilation or heating. The temperature at the time of the visit of the committee was only a few degrees above freezing-point, and other cells were in much the same condition. If abuses had occurred in the past, what assurances had the House that abuses might not occur in future? Another departmental report concerning, not Scotland, but the poor-law system in England, and dated 1930, stated that in a certain number of casual wards the conditions now existing were infamous and intolerable. Some of the committee had visited wards where two men were locked in a small cell that was built for one person, and kept there in darkness for 12 or 13 hours. The point was that that was possible in England in 1930. An unofficial report from a well-informed source stated that some of the poor-houses in Scotland were most admirable. He made no charge against the administration of the Scottish poor-law authorities, who carried out their difficult duties with zeal, efficiency, and humanity, but they had not always the accommodation necessary for detention, much less for solitary detention. In one place the unofficial report stated that a small public assistance shelter had no bath, and the sleeping accommodation was poor. In another case, in a lodging-house where casuals were sheltered at the public expense, it was reported that " the beds were swarming with vermin . . . crowded together, and the floor was filthy." The first thing to do was to provide suitable accommodation.

Mr. BUCHANAN urged that the power to remove old people was one that was capable of the worst abuses and should be removed from the Bill. At present, generally speaking, the old people went to the public hospitals. The chief indictment against the hospitals was that they were not made attractive. The authorities ought to start to build decent houses away from the taint of the poor-house for the old people to live in, then they would go in and there would be no need to exercise compulsory powers.

The Bill was read a second time, and committed to a Standing Committee.

Miners and Silicosis

In the House of Commons on March 29th, on the motion for the adjournment for the Easter recess,

Mr. D. GRENFELL called attention to the wide prevalence of silicosis. He said that an inquiry was held in 1925 by the Mines Department. A report was made to the Department confirming the belief that silicosis in this country was identifiable with miners' phthisis, which had caused such ravages among the South African miners and for which special legislation was provided. Since 1925 there had been investigations and references to departmental committees, but it was not until 1929 that a regulation was issued by the Home Office acknowledging the liability of employers to pay compensation to the victims of this disease. Silicosis was spreading to an alarming extent in the mining industry. The Secretary for Mines must have been surprised at the result of the inquiries made at his (Mr. Grenfell's) instance a short time ago.

It was reported that during a certain period there had been certified in the mines of this country 400 people so disabled as readily to obtain certification. He believed that that figure represented only a small part of the incidence of the disease. He dreaded to estimate the number of people who would become certified year after year as time went on. He urged the Home Secretary to pursue those inquiries which were taking place by the medical staff of his department working in collaboration with a special medical man appointed by the Mines Department. He would like the two Ministers to expedite those investigations with all possible speed. Silica, he was convinced, was not the only mineral which was responsible. There was in the silicious rocks an element called sericite which played a very large part in the production of this disease.

In certain parts of the coalfields the presence of silica and the percentage of it did not account for such widespread prevalence of the disease as in other areas. For example, the figures given by the Inspector of Mines showed that of 424 cases in the whole of Great Britain 386 had been certified in South Wales; that was to say that in one coalfield, where there was 25 per cent. of the mining population, 80 per cent. of the silicosis cases were found. The incidence was higher in certain parts of South Wales than over the whole coalfield on an average. There were special areas where the incidence was exceptionally high, and that could not be explained by varying degrees of contamination with silica, but must be ascribed to some other cause.

Not only was he urging that these investigations should be actively pursued, but no time should be lost in adopting preventive measures. Medical science was quite helpless in this matter. No medical treatment could help these people who had contracted the disease or relieve their condition in the slightest. He would like to see a "safety first" campaign directed to known preventive measures. He was not satisfied that any effective dust-trap had yet been invented. Nor did he think that an effective respirator had been produced which could be made portable and which people could be obliged to wear.

Mr. GRENFELL said he would like to make these preventive measures automatic—not merely dust-proof, but fool-proof—with no possibility of pollution of the air taking place; and the only way that that could be done was to lay the dust at the spot where it was made before it emerged into the atmosphere. To do that effectively a system of wet drilling was the only one which commended itself to him, and there was no reason that he was aware of why an Order should not be made by the Secretary for Mines. He believed that hundreds of lives would be saved if wet drilling were compulsorily imposed.

After further debate, Sir JOHN GILMOUR (Home Secretary) said that one of the great administrative difficulties in dealing with the question was to find absolutely sure and certain ground upon which they could work. Opinions were held by some that the use of water in dealing with drills or laying dust was considered to be a solution. If it was as simple as that they could feel that they could at once take a step forward, but he was informed by those who had studied the problem that while there might be much to be said for using part of this system it was really not conclusive. He thought it was true that they were only working on the fringe of these problems, but he understood that the scientists had been working with a common purpose and with all possible expedition to try, if possible, to improve matters.

He understood, for instance, that there was a mask or respirator which shortly would be available for trial. As to the question of compulsion, they all knew the difficulties of getting a workman unaccustomed to these appliances to make use of them consistently. It was necessary that the beneficial results of such appliances should be explained to the workmen. The Home Office realised that there were difficulties in the width of the source from which infection could come. He understood from those who had investigated the matter that while it was true that sericite was found in certain cases to have deleterious results it had never been established that any case had been proved in which at the same time silica had not been present. If he was right, while sericite might be a contributory cause of the disease, it was not a primary cause. He could assure the House that the Home Office and the Ministry of Mines were endeavouring to investigate the problem. Undoubtedly better ventilation in the mines was of immense importance. In regard to the problem of dust in mines, methods for limiting the range of the explosion were being investigated from all practical sides. If there was anything which could be done to limit the period of time within which it was possible to decide whether compensation was payable he would look into it with the greatest sympathy. Although knowledge of this problem was increasing, and more people might be coming into the arena to whom they could apply for help, the fact remained that this question could only be decided by those who were really conversant with the problem.

The Government, Sir John Gilmour concluded, were at present in communication with the mine owners upon this problem and were actively discussing the aspects—some of them new aspects—upon which quite clearly there were division of opinion on which science had not yet definitely come to a conclusion. He hoped that perhaps at a later stage in the session he might be in a position to say something further.

HOUSE OF COMMONS

TUESDAY, MARCH 27TH

State-aided Houses

Mr. KIRKWOOD asked the Secretary of State for Scotland how many State-aided houses were under construction in Scotland in March, 1933; the number under construction at present; and what was the cause of the decline.—Mr. SKELTON, Under-Secretary of State for Scotland, replied: The number of State-assisted houses under construction by local authorities and private enterprise in Scotland at March 31st, 1933, was 23,503. Figures for March are not yet available. For purposes of comparison I give figures for February of 1933 and 1934. These were 22,315 and 16,446 respectively. With regard to the second part of the question, the hon. Member will recollect that local authorities are at present concentrating upon programmes for slum clearance. These are not sufficiently advanced to be reflected in the houses under construction at Feb. 28th, but the tenders approved for new construction are now showing the effect of this activity, the number of tenders approved for February, 1934, under the Act of 1930, being 1122 compared with 334 in February, 1933.

Shortage of Water-supplies in Scotland

Mr. KIRKWOOD asked the Secretary of State for Scotland how many local authorities in Scotland had reported a shortage of water-supplies; how many villages had no proper supply, even apart from the drought; what action the Government proposed to ensure a supply for all parts of Scotland; and if he was aware that in the vicinity of Loch Katrine there were hamlets and villages which had been short of water-supplies since last summer.—Mr. SKELTON replied: As regards the first two parts of the question, of the local authorities who have so far replied to the inquiry made by the Department of Health in January last, 50 town councils and 9 county councils have reported a shortage of water in their areas during 1933. The replies from the 9 county councils referred to shortages in 65 special water-supply districts, and 43 villages without publicly owned supplies. As regards the third part, the department propose, immediately the Bill at present under consideration in another place is passed, to invite applications from local authorities who desire to participate in the grant to be made available for the improvement of rural water-supplies. As already stated in the House, the Government have under consideration further steps for dealing with an emergency due to the drought should circumstances so require. As regards the last part of the question, I am informed that the only village in the vicinity of Loch Katrine which has been short of water since last summer is Brig o' Turk, and that this case is at present receiving the attention of the county council of Perth.

Medical and Nursing Services in Scottish Islands

Mr. T. B. W. RAMSAY asked the Secretary of State for Scotland if he was aware that there were no hospitals, nursing, or maternity homes in the islands of Harris, North Uist, Benbecula, and Barra, or the smaller islands adjacent thereto, with the exception of a casual sick house in Harris; if he was aware that the medical services for the said islands were performed by visiting doctors and nurses; and what provision was made for sudden and serious illnesses, accidents, and maternity cases in these islands.—Mr. SKELTON replied: The answer to the first part of the question is in the affirmative. The medical and nursing services are provided by doctors and nurses actually resident on the islands named. As regards the last part of the question, arrangements are made wherever practicable for the removal of patients from Harris to the hospital at Stornoway, and from the other islands named either to Oban or Glasgow. Cases from Benbecula are sometimes treated in the private hospital on South Uist. The doctor at Benbecula was specially selected for appointment because of his surgical knowledge and experience. In urgent cases, as an alternative to the removal of the patient, the surgeon from Stornoway, accompanied if need be by a nurse, may travel to his home.

Small-pox at Blackburn

Mr. Groves asked the Minister of Health whether any of the Blackburn small-pox patients had been vaccinated before removal to hospital with small-pox: and, if so, how many days before such removal was the vaccination performed in each case.—Sir Hilton Young replied: Five patients were vaccinated shortly before removal to hospital. Two of these were vaccinated during the incubation period of the disease six and ten days respectively before removal. Three were vaccinated after the illness had begun—one on the day of removal, one the day before removal, and the third four days before removal.

Medical Examination of School-children

Mr. Groves asked the Parliamentary Secretary to the Board of Education whether any regulations existed that required the presence of a female nurse during the medical examination of school-children.—Mr. Ramsbotham replied: The Board of Education have not made any regulation requiring the presence of a nurse during the medical examination of school-children, but it is the general practice for a school nurse or some other woman helper to be present.

Sickness Benefit and Housework

Mr. Parkinson asked the Minister of Health if he had authorised the decision that when an insured woman, who was in receipt of national health insurance benefits, was certified by a medical officer as being able to do housework though unable to follow her usual occupation, her benefits should cease, even though she intended to resume her own occupation as soon as her health would permit.—Sir Hilton Young replied: There is no general decision that an insured woman who, though unable to follow her usual occupation, is able to do housework, is to be treated as not entitled to sickness or disablement benefit. An approved society would not ordinarily regard such a woman as disentitled to benefit pending her early return to her normal employment, but in the case of a woman who is the domestic head of a household and for whom, accordingly, the performance of household duties is in the nature of an alternative to her industrial employment, fitness for the former as well as for the latter form of work would properly be taken into consideration. Societies have been informed that it is their duty to consider every such case on its merits, and any woman who is dissatisfied with the decision of her society is entitled to appeal in accordance with the rules of the society.

WEDNESDAY, MARCH 28TH

New Formulæ for Surgical Spirit

Miss Horsbrugh asked the Secretary to the Treasury the reason for the withdrawal as from March 15th, 1934, of the formula permitted during the past years for the manufacture of the preparation of methylated spirit known as surgical spirit and the substitution of two new alternative formulæ.—Mr. Hore-Belisha replied: The object was to achieve a still higher degree of unpalatability in the product.

THURSDAY, MARCH 29TH

Medical Examination of Motorists charged with being Drunk

Mr. Isaac Foot asked the Home Secretary if he had now been able to consider the remarks of Mr. Justice Swift at the recent Liverpool assizes as to the examination of persons charged with being intoxicated whilst driving motor-cars; and if he proposed to amend the existing practice relating to the examination of such persons by doctors called in by the police.—Sir J. Gilmour replied: I have had this matter under consideration, but at the moment I am not in a position to make any statement.

Food Standards

Captain Erskine-Bolst asked the Minister of Health when the report of the departmental committee on food standards would be available.—Sir Hilton Young replied: The report has just been presented to me, and I am giving instructions for its publication as soon as possible after Easter.

MEDICAL NEWS

Society of Apothecaries of London

At recent examinations the following were successful:—

Surgery.—A. J. L. Bolger, Univ. of Liverp.; J. L. Freer, Guy's Hosp.; J. C. Harvey, St. George's Hosp.; C. W. O'Donoghue, London Hosp.; F. D. Paterson, St. Mary's Hosp.; J. D. Taylor, Univ. of Manch.; and T. H. N. Whitehead, Univs. of Oxf. and Leeds.

Medicine.—A. J. L. Bolger, Univ. of Liverp.; A. C. E. Cole, Univ. of Camb. and St. Mary's Hosp.; R. Frankling, Guy's Hosp.; J. Lipschitz, Westminster Hosp.; B. C. M. Palmer, Univ. of Camb. and Guy's Hosp.; and T. H. N. Whitehead, Univs. of Oxf. and Leeds.

Forensic Medicine.—A. J. L. Bolger, Univ. of Liverp.; M. T. Curran, Univ. of Leeds; B. C. M. Palmer, Univ. of Camb. and Guy's Hosp.; H. Paroulakis, Univ. of Innsbruck and St. Mary's Hosp.; J. H. Playne, St. Mary's Hosp.; F. W. Treadwell, Univ. of Birm.; and T. H. N. Whitehead, Univs. of Oxf. and Leeds.

Midwifery.—A. J. L. Bolger, Univ. of Liverp.; R. N. Crossley, Univ. of Manch.; M. T. Curran, Univ. of Leeds; B. Dayal, Univ. of Durham; J. H. Playne, St. Mary's Hosp.; and T. H. N. Whitehead, Univs. of Oxf. and Leeds.

The following candidates, having completed the final examination, are granted the diploma of the society entitling them to practise medicine, surgery, and midwifery: A. J. L. Bolger, A. C. E. Cole, B. Dayal, R. Frankling, J. L. Freer, J. C. Harvey, J. Lipschitz, B. C. M. Palmer, J. D. Taylor, and T. H. N. Whitehead.

Honours for Sir H. Wellcome

The American Pharmaceutical Association has awarded its Remington medal, which is conferred for distinguished service to pharmacy, to Sir Henry Wellcome, F.R.S., founder of the Wellcome Research Institution and head of Burroughs Wellcome and Co. Apart from the numerous laboratories of the establishments of his firm, Sir Henry has established a number of research laboratories and *museums which are coördinated as the Wellcome Research* Institution. The new building of this institution occupies a site in the Euston-road, London.

The President of the French Republic has conferred upon Sir Henry the Cross of Chevalier of the Legion of Honour.

Royal College of Surgeons of Edinburgh

At recent examinations the following candidates were successful:—

L.D.S.

L. B. Corner, W. R. Weatherston, T. H. Thompson, R. J. E. Derwent, W. H. Charlton, R. O. Walker, A. E. Thompson, A. V. Robson, J. H. Quin, Frederick Gilhespie, W. R. D. Boyd, and G. A. McC. Durran.

Charing Cross Hospital Nurses' Hostel

It has been decided to complete the original scheme for this hostel at Haverstock Hill at a cost of £30,000. It will then be possible to release much space in the hospital for paying patients. By the generosity of the Daimler Company the nurses are carried to and fro in two large motor coaches.

University of Liverpool

On Friday, May 11th, the University will celebrate the centenary of the incorporation of its medical school. It is proposed to confer the honorary degree of D.Sc. on Dr. Henry Dean, professor of pathology in the University of Cambridge, and Master of Trinity Hall; Sir Thomas Lewis, F.R.S., physician to University College Hospital, London; Mrs. May Mellanby, investigator for the Medical Research Council; and Mr. Wilfred Trotter, F.R.S., surgeon to University College Hospital, London. The honorary degree of LL.D. will be conferred on Prof. William Blair-Bell, who held the chair of obstetrics and gynæcology in the University from 1921 to 1931, and was first president of the British College of Obstetricians and Gynæcologists; Prof. Henry Briggs, the previous holder of the chair (1898–1921); Dr. H. R. Hurter, past president of the Liverpool Medical Institution; and Dr. W. S. Paget-Tomlinson, lately chairman of the public health committee of Westmorland.

Gift for Radiology at Middlesex Hospital

Mr. E. W. Meyerstein has given £30,000 for the establishment of a new department of radiology.

University of Glasgow

At a graduation ceremony to be held on June 20th the honorary degree of LL.D. will be conferred on Dr. René Leriche, professor of clinical surgery in the University of Strasbourg.

German Radiological Society

The twenty-fifth congress of this society will take place at Baden-Baden from April 14th to 16th. Particulars may be had from Dr. Kloiber, Röntgenabteilung des Städtischen Krankenhauses, Baden-Baden.

Surgical Treatment of Tuberculosis

At the annual meeting last week of the governors of the Brompton Hospital for Consumption, Lord Derby said that whereas 12 years ago there were 66 cases of surgical treatment and one visiting surgeon, the hospital now has two surgeons and two assistant surgeons on the staff, and the surgical operations last year reached the record total of 1122. The daily average of occupied beds was 464.

Westminster Hospital Appeal

Westminster Hospital has succeeded in raising within five months the £100,000 required to secure the site at St. John's-gardens, Millbank, on which a new hospital is to be built at a cost of £700,000. Two large donations lately received which have helped to bring the fund to its present total of nearly £107,000 are £10,000 voted by the Middlesex county council and £5000 from the James Gardiner trust. The other half of the sum needed to buy the site will, it is hoped, be obtained by selling the ground occupied by the present building.

Soho-square Hospital for Women

The 1410 in-patients treated last year were the lowest number since 1929, and consequently the average cost per patient increased considerably. The number of new out-patients has also fallen, but the attendances have increased owing to the opening of the new clinic for the special treatment of certain cases.

A Waiting-list at Belfast

On Dec. 31st, 1933, the waiting-list at the Royal Victoria Hospital, Belfast, numbered 1025. There were 6285 admissions, the highest on record, but the average stay of 21·9 days was the shortest yet recorded, being a reduction of 2·5 days compared with 1932. Last year the hospital spent £1590 upon motor accident patients, of which only £374 had been recovered. At the end of the year there were, however, still 127 claims outstanding. The daily average number of beds occupied was 400.

Hospital Treatment for the Middle Class

After long negotiations a scheme has been agreed to by the Hospital Service Association and the Hospital Staffs Association at Liverpool whereby hospital treatment is assured to people of the middle class. For a payment of 1s. per week, contributors with no dependents, whose annual income does not exceed £400, or with one dependent £500, or with more than one dependent £600, will be entitled to first-class hospital treatment, including necessary surgical and medical attention whilst an in-patient. Dependents of a person whose income comes within these limits also are entitled to benefit. A minimum membership of 10,000 is anticipated.

Royal Northern Hhe lines was of im

At the re une problem of dust in min Royal Northern Group of range of hospital sion were being l complement of be recent annual meeting of the any for the last two Hospitals it was stated that the with the casualty is 466, of which 43 have been the total, received years for lack of means. Last closed nor accident department, which is the Islington war year the id's pay- 17,475 patients, a large number of memorial that the cases. Patients, including those in them motor completed bed wing, paid a total of £54,346. the St. Dav the main nurses' home, begun last year, will It is hoped £139,000, to accommodate the 156 nurses speedily be co buildings building of the group. The debt who are in 0. of which £73,000 is on account now amounts to of the whole group; their cost of the land and has been £433,00

Medical Diary

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.
MONDAY, April 9th.
United Services. 4.30 P.M. Annual General Meeting. Surg.-Commander J. G. Danson: The Symptom of Vertigo.

NORTH LONDON MEDICAL AND CHIRURGICAL SOCIETY, Royal Northern Hospital, Holloway-road, N.
THURSDAY, April 12th.—9 P.M., Dr. E. G. B. Calvert: Clinical Demonstration.

HUNTERIAN SOCIETY.
MONDAY, April 9th.—7.15 P.M. (at Simpson's Restaurant, Cheapside), Annual General Meeting followed by an Address by Sir Frederick Hobday on the Debt Veterinary Science owes to John Hunter. (Lantern Slides and Cinema Films.)

SOUTH-WEST LONDON MEDICAL SOCIETY, Bolingbroke Hospital, Wandsworth.
WEDNESDAY, April 11th.—9 P.M., Dr. T. C. Hunt: Recent Advances in Treatment.

MEDICAL SOCIETY OF INDIVIDUAL PSYCHOLOGY, 11, Chandos-street, W.
THURSDAY, April 12th.—8.30 P.M., Dr. H. C. Squires: Individual Psychology and the European in the Tropics.

LONDON JEWISH HOSPITAL MEDICAL SOCIETY, Stepney Green, E.
THURSDAY, April 12th.—3 P.M., Clinical Meeting.

SOCIETY FOR THE STUDY OF INEBRIETY, 11, Chandos-street, W.
TUESDAY, April 10th.—4 P.M., Sir Humphry Rolleston: Aims and Work of the Society during the 50 years of its existence.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, London, W.
MONDAY, April 9th, to SUNDAY, April 15th.—ST. MARK'S HOSPITAL, City-road, E.C. Course in Proctology. All day.—INFANTS HOSPITAL, Vincent-square, S.W. Course in Infants' Diseases. Afternoons.—BRITISH RED CROSS CLINIC FOR RHEUMATISM, Peto-place, N.W. Tues. and Thurs., at 8 P.M. Course in Rheumatism.—SOUTHEND-ON-SEA GENERAL HOSPITAL. Week-end Course in Medicine and Surgery. Sat. and Sund. All day.—MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W. Lecture-demonstration by Dr. A. E. Clark-Kennedy on Shortness of Breath. Tues., at 2.30 P.M.—NATIONAL TEMPERANCE HOSPITAL, Hampstead-road, N.W. A Demonstration of Surgical Cases, by Mr. A. E. Mortimer Woolf, on Sat., at 3 P.M.—WEST END HOSPITAL FOR NERVOUS DISEASES, In-patient Department, Gloucester-gate, N.W. Demonstration on the Fundus Oculi, by Mr. R. Lindsay Rea, on Wed., at 8.30 P.M. (Specially suitable for M.R.C.P. candidates.)—MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W. Lectures by Dr. Philip Ellman on Wc
Tuberculosis (1), and Frid.
—PANEL OF TEACHERS.
branches of Medicine and
by arrangement with t
Courses of instruction, clinics, lectures, &c., arranged by the Fellowship of Medicine, are open only to Members and Associates.

ROYAL NORTHERN HOSPITAL, Holloway-road, N.
TUESDAY, April 10th.—3.15 P.M., Mr. Eric I. Lloyd: The Surgery of Poliomyelitis. (Lecture-demonstration.)

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.
FRIDAY, April 13th.—4 P.M., Mr. A. Lowndes Yates: Emergency Operations in the Throat, Nose, and Ear.

UNIVERSITY OF BIRMINGHAM.
TUESDAY, April 10th.—3.30 to 5 P.M. (at the General Hospital), Mr. F. A. R. Stammers: The Newer Surgery of the Sympathetic Nervous System. Demonstration of cases.
FRIDAY.—3.30 to 5 P.M. (at the Queen's Hospital), Dr. G. Eden: Demonstration of Medical Cases.

ANCOATS HOSPITAL, *Ancoats, Manchester* (Post-graduate Lecture).
THURSDAY, April 12th.—4.15 P.M., Mr. P. G. McEvedy: Diseases of the Salivary Glands.

LEEDS GENERAL INFIRMARY.
TUESDAY, April 10th.—3.30 P.M., Mr. Black: Demonstration of Ophthalmic Cases.

MANCHESTER ROYAL INFIRMARY.
TUESDAY, April 10th.—4.15 P.M., Mr. W. H. Hey: The Present Position of Treatment of Cancer of the Breast.
FRIDAY.—4.15 P.M., Dr. W. Brockbank: Demonstration of Medical Cases.

SALFORD ROYAL HOSPITAL.
FRIDAY, April 13th.—4.15 P.M., Mr. R. Ollerenshaw: Surgical Treatment of Paralysis. (Cinematograph Demonstration.)

GLASGOW POST-GRADUATE LECTURES.
WEDNESDAY, April 11th.—4.15 P.M. (at the Western Infirmary), Dr. J. G. Macgregor-Robertson: Male Venereal Diseases.

NOTES, COMMENTS, AND ABSTRACTS

THE MARYLEBONE RHEUMATISM CLINIC

THE fourth year of the British Red Cross Society's clinic for rheumatism at Peto-place, Marylebone-road, has shown the staff the kind of clinical material that may be expected at an out-patient department of this kind. According to the classification now approved by the visiting physicians the percentage of patients was as follows:—

Patients Showing Some Form of Rheumatism

	Group A. Articular.	*Group B.* Non-articular.
1. Infective—		
(*a*) Non-specific	15·5	11·4
(*b*) Specific	1·8	1·3
2. Traumatic	2·8	2·0
3. Degenerative—		
(*a*) Senile (osteo-arthritis) ..	17·0	0·3
(*b*) Climacteric	5·1	1·2
4. Metabolic—		
(*a*) Gout	2·2	0·3
(*b*) Rheumatoid	4·3	0·04
(*c*) Other Metabolic	2·8	2·3
5. Unclassified	2·1	17·3
	53·6	36·1
Group C.—Patients suffering from some sequel of rheumatic fever		2·3
Group D.—Patients suffering from non-rheumatic conditions		8·0

There has been little variation in the relative percentages of the main groups for the past three years. A large number of patients suffering from some manifestation of rheumatism had, in addition, some associated non-rheumatic condition (but are not included in Group D).

Any attempt to assess the gross results of treatment must, in the medical board's opinion, be accepted with a certain amount of reserve, since there are so many factors that modify interpretation and deduction. The stage of the disease at which the patient comes up for treatment, the type of the rheumatic manifestation, the economic factor, the nature of the patient's occupation, the ability of the patient to take full advantage of the resources available for treatment, the presence of any associated non-rheumatic disease, all tend to alter and detract from the value of any figures that may be quoted. Bearing all these facts in mind, the following figures represent the results of the investigation into the effect of treatment on the 957 men and 1615 women who were discharged from the clinic during 1933. Of these 196 men and 419 women did not complete their treatment; 43 men and 54 women were discharged on account of intercurrent disease. Of the remaining 718 men and 1142 women:—

—	Men.	Women.	Men and women.
	Per cent.		
Cured	26·0	13·2	18·3
Considerably improved ..	25·9	27·6	26·8
Definitely ,, ..	32·5	36·6	35·0
Slightly ,, ..	2·2	3·8	3·2
Unchanged	12·1	17·8	15·6
Worse	1·3	1·0	1·1

This year, as last, the percentage of men discharged as cured is almost double that of the women. The explanation given is that a larger proportion of men attending the clinic were suffering from some non-articular form of rheumatism, and that men, being usually the chief wage-earner of the family, were more likely to present themselves for treatment early, owing to the serious economic results of prolonged disability.

During the year the ten beds allocated for in-patient treatment to the clinic by the London County Council have been transferred from St. Charles' Hospital to St. Stephen's. The report emphasises the need for facilities to be provided for in-patient treatment under their supervision at a site near to the clinic, where any special or detailed investigations, as well as any form of physical or other type of treatment can be carried out that would be impracticable in an out-patient department. The lack of these facilities is proving a handicap to the work.

The need for continued research is being borne in mind. There are several clinical assistants whose time is now almost entirely taken up with routine examinations and investigations. Some grant of money would be required if new investigations are to be made, and the appointment of one or more full-time research workers would have to be considered. Directions of past and present work are these:—

An investigation of the vasomotor changes in rheumatoid arthritis.

The effect of vaccine treatment of rheumatism.

A comparison of the clinical results of treatment by autogenous, stock, and non-specific vaccines.

The value of acetylcholine injections in the treatment of rheumatism.

The assessment of the climatic factors in the rheumatic diseases.

An investigation of the types of arthritis occurring at the menopause.

The value of histamine ionisation in the treatment of rheumatism.

The treatment of arthritis by pelvic diathermy.

A comparison of the results obtained by different physical treatments.

Differential diagnosis of chronic arthritis affecting the hip-joint.

The value of the sedimentation-rate.

The use of gold salts in the treatment of arthritis.

Periodic demonstrations are given by members of the visiting staff, and regular courses of post-graduate lectures under the auspices of the Fellowship of Medicine. Lectures in medical hydrology have also been delivered to members of the Chartered Society. Each visiting physician has a senior as well as several junior clinical assistants; the appointment enables qualified practitioners anxious to gain experience of the physiotherapeutic and other methods employed in the treatment of rheumatism.

LEAD AND WATER

ALTHOUGH poisoning due to the use of lead pipes for conveying water has been recognised since Roman times it still finds occasional victims—as, for instance, in the Scottish outbreak reported in our columns last year.[1] It is, therefore, cause for satisfaction that the Water Pollution Research Board is devoting attention to this source of danger. A summary of existing knowledge of the subject has just been issued by the Board, apparently as a preliminary to research at the Chemical Research Laboratory, Teddington, and this summary,[2] which has been prepared by Mr. H. Ingleson, D.Phil., itself illustrates the need for investigation under precisely defined conditions.

On the physiological or pathological side it seems that people vary greatly in their susceptibility to lead poisoning and that the classical symptoms associated with industrial poisoning are not necessarily to be expected when the lead is taken in drinking water. At the outset Ingleson quotes Wynne, who thinks it possible that "rheumatic" cases which derive temporary benefit at watering-places and spas may be cases of undetected plumbism arising from small quantities of lead habitually ingested with water. Since the urine and fæces of "normal" subjects contain appreciable quantities of lead it is difficult to say when lead ingestion begins to be harmful. Various authorities give widely differing amounts of lead as conferring dangerous properties on water, for whilst Wright, Sappington, and Rantoul consider that as little as 0·3 part per million has caused poisoning, and most American workers fix this as a limit, Thresh, Beale, and Suckling would allow up to 0·5 part and A. Smith has found that 1·44 part is "not dangerous to some people." It may be observed that some drink very little water, and that lead tends to be removed from solution (or quasi-solution) in the process of preparing tea or coffee.

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[1] THE LANCET, 1933, ii., 374 and 1156.

[2] Department of Scientific and Industrial Research, Water Pollution Research, Technical Paper No. 4, The Action of Water on Lead with special reference to the Supply of Drinking Water, Summary of Existing Knowledge. By H. Ingleson, M.A., D.Phil. London: H.M. Stationery Office. 1934. 2*s*.

Ingleson states that lead pipes are in use in Cordova which date from the Moorish occupation about A.D. 850 and other very old pipes are in use and have given rise to no toxic symptoms. It is usually stated that hard water attacks lead less than soft water, but though this seems in the main to be true, notable exceptions have been observed. It may be taken as certain that pure distilled water does not act on pure lead in the absence of oxygen. This was shown by Lambert and Cullis, who also found that whilst lead which had been in contact with water for 12 months was tarnished only slowly when oxygen was admitted, in some cases lead which had been in water for only a few days after it (the lead) had been distilled tarnished rapidly when oxygen was admitted. In fact the amount of attack seems to depend on the state of the lead or on the metals with which it is alloyed as well as on the impurities of the water.

NEW PREPARATIONS

Somnacetin (Dr. R. and Dr. O. Weil, Frankfort-on-Main. *Agent:* Francis O. Rudloph-Riddell, Sentinel House, Southampton-row, London, W.C.).—This is a hypnotic of the barbituric group concerning whose utility articles have appeared in the German press for several years. It is a Sodium-diethyl-barbitone-Phenacetin-Codeine combination, and the literature confirms what might be expected of it therapeutically. We note that several of the articles give warning of the risks that may be incurred in taking it, but there appears to be no such caution issued with the various preparations—ampoules, tablets, capsules, drops, and suppositories. These are put on the market in convenient form and neatly packed, and the preparation has behind it useful authority as hypnotic and sedative.

Menformon (Organon Laboratories, 1, Gordon-square, London, W.C.).—This œstrogenic hormone is put up in two forms, an oily solution where each 1 c.cm. contains 10,000 international units and a watery solution where each 1 c.cm. contains 1000 international units. The biological standardisation has been carried out in the laboratories of the company at Oss, Holland, by Prof. E. Laqueur, director of the department of pharmacology and therapeutics, Amsterdam. The aqueous solution is stated to be the strongest that can be made without precipitation and is easy to inject.

Births, Marriages, and Deaths

BIRTHS

Bailey.—On March 24th, at Bentinck-street, the wife of Dr. C. P. Bailey, The Chantry, Ingatestone, Essex, of a daughter.

Davidson.—On March 24th, the wife of A. Whyte Davidson, F.R.C.S.E., Christchurch, Hants, of a daughter.

Earlam.—On March 26th, the wife of Francis Earlam, M.D., Quendale, Mossley Hill, Liverpool 18, of a son.

Power.—On March 26th, at Hereford, the wife of R. Wood Power, F.R.C.S.I., of a son.

MARRIAGES

Abrahams—Lesser.—On March 27th, Sidney Abrahams, M.D., of Grove Green-road, Leytonstone, to Marion Hilary, [illegible] Mrs. Albert Lesser, of Brondes-[illegible] N.W.

[illegible] Church, Wigan, on April 2nd, [illegible] Marjorie Birch, M.B., Ch.B., only daughter of Mr. and Mrs. A. J. Birch, of Gidlow-lane, Wigan.

DEATHS

Fernie.—On March 30th, at Stone, Staffordshire, John Firth Fernie, M.R.C.S., L.R.C.P., aged 61 years.

Nixon.—On March 24th, at Plympton House, Plympton, John Clarke Nixon, M.B., aged 63 years.

Park.—On March 31st, George Williamson Park, M.B., C.M., B.Sc., of Abbotsford-crescent, Edinburgh, late of the Medical Department, Edinburgh Town Council.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Appointments

Radford, M., M.D., B.S. Lond., has been appointed Medical Officer of Health for St. Pancras.

City of London Maternity Hospital: **Moon, A. A.**, M.B. Syd., Senior Resident Medical Officer; **Gilbert, B.**, M.B., B.S. Lond., Junior Resident Medical Officer.

Medical Referees under the Workmen's Compensation Act: **Batt, B. E. A.**, M.B., B.Ch. Oxf. (Circuit 33, Bury St. Edmunds, &c.); **Drinkwater, S. W.**, M.B., Ch.B. Manch. (Circuit 23, Atherstone, &c.).

Vacancies

For further information refer to the advertisement columns

Aberdeen, City Fever Hospital.—Jun. Res. M.O. £100.
Albert Dock Hospital, Connaught-road, E.—Res. M.O. At rate of £110.
Birmingham and Midland Eye Hospital.—Res. Surg. O. £200.
Birmingham, Erdington House.—Second Asst. M.O. £650. Also Jun. Asst. M.O.'s. Each at rate of £200.
Brighton County Borough.—Sen. Res. Asst. M.O. £400.
Brighton Education Committee.—Asst. School M.O. and Asst. M.O.H. £500.
Brighton, Royal Sussex County Hospital.—Hon. Clin. Asst. to Ophth. Dept.
Bristol University.—Lecturer in Dental Mechanics.—£600–£700.
Cambridge, Addenbrooke's Hospital.—H.P. and H.S. to Spec. Depts. Each at rate of £130.
Canterbury, Kent and Canterbury Hospital.—H.S. At rate of £125.
Chester City Hospital.—Res. M.O. £400.
Croy[illegible] Jun. Res. Asst. M.O. £300.
East [illegible] *Memorial Hospital.*—Two Hon. H.S. £150.
East Ham Memorial Hospital, Shrewsbury-road, E.—Res. M.O. £200.
Glasgow, Royal Samaritan Hospital for Women.—Asst. Radiologist.
Golden-square Throat, Nose and Ear Hospital, W.—H.S. £100.
Hampstead General and N.W. London Hospital, Haverstock Hill, N.W.—H.S. At rate of £100.
Harrogate Royal Bath Hospital.—Res. M.O. At rate of £150.
Hospital for Epilepsy and Paralysis, 4, Maida Vale, W.—Res. M.O., and H.P. At rate of £150 and £100 respectively.
Hospital for Sick Children, Great Ormond-street, W.C.—Res. M.O. Country B[illegible]
Ilford, King Ge[illegible] rate of £100.
King's College [illegible] *S.E.*—Hon. Radiologist.
Leicester, Coun[illegible]*lation Hospital, Markfield.*—Res. M.O. [illegible]
Lord Mayor Treloar Cripples' Hospital and College, Alton, Hants.—Asst. Res. M.O. £150–£200.
Manchester, St. Mary's Hospitals.—Three H.S.'s to Spec. Depts. Each at rate of £50.
Margate, Royal Sea-Bathing Hospital.—Res. Asst. Med. Supt. £500.
Merthyr Tydfil Education [illegible] £500.
[illegible]).
[illegible] Ophth. Surg. Also Hon. Asst. Radiologist.
Nelson Hospital, Merton, S.W.—Res. H.S. At rate of £100.
Nottingham General Hospital.—H.P. At rate of £150.
Preston County Borough.—Asst. School M.O. £500.
Preston, County Mental Hospital, Whittingham.—Deputy Med. Supt. £750.
Princess Elizabeth of York Hospital for Children, Shadwell, E.—H.P. and Cas. O. Each at rate of £125.
Queen Charlotte's Maternity Hospital, Marylebone-road, N.W.—Hon. Ear, Throat, and Nose Surgeon.
Reading, Royal Berkshire Hospital.—H.P., H.S., and Cas. O. Each at rate of £150.
Rochdale Infirmary and Dispensary.—Jun. H.S. £200.
Rotherham Hospital.—Cas. H.S. £150.
Royal College of Surgeons of England.—Examiners.
Royal Masonic Hospital, Ravenscourt-park, W.—Res. Surg. O. At rate of £250.
St. Thomas's Hospital, S.E.—Physician.
Samaritan Free Hospital for Women, Marylebone-road, N.W.—H.S. At rate of £100.
Smethwick County Borough.—Sen. Asst. M.O.H. £750.
Southampton, Royal South Hants and Southampton Hospital.—Hon. Clin. Asst. to Ear, Nose, and Throat Dept.
Southend-on-Sea General Hospital.—Cas. O. At rate of £100.
South London Hospital for Women, Clapham Common, S.W.—H.P. At rate of £100.
Southport General Infirmary.—Jun. H.S. £150.
Stafford, Staffordshire General Infirmary.—H.P. At rate of £150.
Swansea General and Eye Hospital.—H.P. At rate of £150.
West End Hospital for Nervous Diseases, Gloucester Gate, Regent's Park, N.W.—H.P. At rate of £150.
Western Ophthalmic Hospital, Marylebone-road, N.W.—Sen. and Jun. Res. H.S.'s. At rate of £150 and £100 respectively.
Woodside Hospital, Woodside Avenue, Muswell Hill, N.—H.P. £100.

Donations and Bequests.—Greenock Royal Infirmary and Larkfield Hospital will benefit by a legacy of £1000 which has been left by ex-Bailie John Alston, at one time chairman of directors, for the purpose of endowing a bed in memory of his sister, Miss Janet Hill Alston.

ADDRESSES AND ORIGINAL ARTICLES

THE MEDICAL CURRICULUM AND MEDICAL EDUCATION

BY CHARLES A. PANNETT, M.D.Lond., F.R.C.S.Eng.

PROFESSOR OF SURGERY, UNIVERSITY OF LONDON; SURGEON TO ST. MARY'S HOSPITAL

FROM time to time above the undergraduate murmurings of discontent at the appalling and discouraging prospect of the present day medical curriculum is heard the voice of a dean or teacher of a medical school, commiserating with the student, criticising and condemning, though not with perhaps the same freedom of expression, what every reasonable man must regard as an educational structure which has grown unwieldy and cumbersome in its size and distorted in its scope. There is a movement for reform not only in this country but in almost every land abroad. Much has been written of late and many true things said about the defects of the present system. What most writers are agreed upon is the necessity for some simplification and the need to unburden the curriculum of things of doubtful value. The real difficulty is in knowing what things to withdraw; in fact, to assess the educative value of its different parts.

THE EARLIER STUDIES

There is an underlying current of revolt against the preliminary subjects chemistry, physics, and biology being taught by specialists who have no medical interest, against anatomy and physiology being taught with no reference to disease and a desire to introduce these teachers into the hospital wards and their students to clinical problems at a very early stage of their career. There is particularly a tendency to advocate the instilling of knowledge which has a practical bearing on the work of the later years. Let us cut out botany, says one man; it has little relation to clinical medicine; and of what use is it to learn the anatomy of a dogfish asks another? The intricacies of human anatomy will soon be forgotten and the minutiæ of physiology are of doubtful value.

THE LATER CLINICAL YEARS

With one accord there is a demand to prolong the period during which the student is in clinical contact with the patient. But, say the critics, cease to burden his mind with innumerable facts, teach him principles, train him to think. Remember that the bulk of all students will become general practitioners. Equip them always with this aim in view. Cease to emphasise and in some cases omit instruction in the rarer diseases. Concentrate upon the common problems of everyday practice.

THE OBJECT OF MEDICAL EDUCATION

It is well indeed for us to keep in the forefront of our minds the object of the training of the medical student. It is first and foremost the production of a doctor in whose hands the general public may implicitly entrust the care of their bodily ills. Now such a man must above all have a sound knowledge of general medicine and surgery, but he must have in addition a brain trained to deal intelligently with other than medical problems of life, he must possess that priceless quality common sense. We must also remember that some, and indeed perhaps an unadvantageous increasing number of students, will want to specialise. The path to them must remain open.

AN ANALYSIS OF THE DEMANDS

Amongst all the voluminous criticism of the medical curriculum there is a repeated reversion to this ideal of the production of the sound general practitioner, the practical man, the man of common sense; and hints, rather vague, by most of the critics, that some simple modification of the syllabus or methods will achieve this end. There is a reiteration of the advice to inculcate principles, eliminate details, abolish the memorising of innumerable facts, to train the man to think. There is a rather significant absence of instruction as to the methods by which these laudable ambitions may be attained. There are several misconceptions involved in this view of medical education. There are the quite unwarranted assumptions that in general the clinical phenomena of disease conform to established laws and principles, that the facts of disease are of secondary importance, that it is actually possible to teach men to think. When we test the truth of the first assumption we find the simple principles, for example, that the obstruction of the duct of any gland will cause dilatation of the channels behind the hindrance and predispose to infection, are singularly few in number. We find that when we try to make the phenomena of immunity conform to some law as did Ehrlich in his famous side-chain theory, that the exceptions are so numerous and the departures from the expected necessitate such complicated modifications of the hypothesis that it becomes in fact a lamentable failure. Or again, take the enunciation that hyperæmia leads to decalcification of bone. The upholders of this are forced to resort to the most curious explanations to make the facts conform to principles, and we are forced to admit that the science of medicine has not yet reached that stage in which many simplifying laws are established. Neither can we, if we are to be of any use in medicine, dispense with hundreds of isolated and unrelated facts. No intellectual process could lead a man to the deduction that the commonest site of a rodent ulcer is beside the nose, a very useful fact for diagnosis, any more than it could reveal to him that a robin has a red breast. The science of medicine has not yet passed beyond the stage of the collection of multiple facts. Their correlation is yet in a very rudimentary stage. The acquisition of a multitude of facts is unfortunately for the indolent an indispensable qualification for a very mediocre practitioner.

Then there is this question of teaching a man to think. No student can be taught to think. He may have pointed out to him the similarities or differences of things, the sequences of events with the hope that he will similarly correlate other facts in nature that he may observe. But this is indeed the common procedure in all education and is in no way peculiar to medicine. Lastly, without troubling ourselves how it is to be acquired, we may helpfully inquire into the nature of that quality called common sense. This is very simply stated. It is nothing more than the knowledge of how inanimate matter or human beings react to change in their environment. It is really an intimate knowledge of natural phenomena. That iron is hard, wool soft, that a match will not support the weight of a ton, that an electric current in the neighbourhood of a magnet will cause the latter to deviate, when applied to the problems of everyday life are all examples of the use of common sense, so is the application of the much more difficultly acquired and subtle knowledge that one man will be courageous in the face of danger, another a craven, a third trustworthy, a fourth self-reliant. This is usually called a knowledge of human nature.

FUNDAMENTAL CONSIDERATIONS IN CURRICULUM REFORM

It is such simple but supremely important considerations, so briefly set out above, that must dominate any attempt to reform the medical curriculum. If above all things we want our doctors to think clearly about the manifold problems of general practice we can scarcely lay too much stress upon a preliminary education which comprises some exact branch of knowledge. It does not really matter whether this is the practice of mathematics, the writing of Latin prose, or the accurate experimentation of the physicist, provided the student advances sufficiently into his subject to have his intellectual processes drilled into exact methods. It is this intellectual attitude rather than the knowledge gained which will be of priceless value to him for the remainder of his life. This is the argument above all others against making the preliminary and intermediate subjects take on too much an applied character, against the abolition of professional chemists, anatomists, or physiologists as some seem actually to desire. Taking a long view it would be unwise to curtail the preliminary sciences, chemistry, physics, and biology. Rather would more physics and chemistry appear to be of more ultimate value to the future practitioner from the utilitarian point of view. Neither does it seem profitable to reduce the time spent upon anatomy, histology, and physiology. These are of such importance as the basis of clinical medicine that groundwork in them can scarcely be too thorough. I do not believe that the modern anatomist is out of touch with surgical or medical needs. In this and other preclinical subjects the syllabus can best be left to the judgment of a select committee of the several experts. The educational value of their recommendations is likely to be much greater than any scheme evolved by clinical teachers.

The intellectual preparation of the student during his preclinical years is likely to be jeopardised by his early introduction to clinical methods frequently so lacking in exactitude, and the incalculable advantage of a training in pure science during his most impressionable years might be lost. On the whole I do not think anything would be gained by the early introduction of the student to clinical work.

THE CLINICAL PERIOD

But having been prepared by this seemingly long training in the preliminary subjects, having acquired, it is hoped, right intellectual habits, the more clinical contacts the student can acquire the better. If his former training has been really good the less he is worried by lectures the better. There is one exception, he should attend a long and comprehensive course of pathology. The system of forcing him to devote his first three months exclusively to this subject has much in its favour. More time should be given to general medicine and surgery than to the specialties. He should be free to roam rather than forced into specialised channels. Let him acquire as many facts as he can. It will never again be as easy to him as in the early twenties.

THE STUDY OF COMMON DISEASES AND CONSIDERATION OF THE RARE

There is much to be said for stressing the phenomena of the common diseases met with in general practice, but it does not appear to me that general practitioners' services need be enlisted for this purpose. The phenomena of such diseases are well known, but many of them are not suitable from an educational point of view as examples of infectious or other illness owing to the defects of knowledge of their ætiology, prevention, and treatment. We have only to mention the common cold, fibrositis, influenza, to realise the truth of this statement. Perhaps a few clinical teachers in their enthusiasm for some special study lay too much stress upon rarer forms of disease, but let us not forget that the examples upon which they teach actually come from general practice, and if a student is to know anything about them he must learn them at hospital, for the opportunity may seldom present itself again. Similar considerations apply to instruction in methods and surgical operations which the doctor may never have to practise himself. Surely it is the duty of the clinical teacher to present a vista of medicine to its very boundaries. The practitioner must know, in the interests of his patients, not only that rare diseases exist, but where to turn up the knowledge of such diseases, and he must know the therapeutic possibilities that science and skill have placed in our hands. We must not take a too utilitarian narrow view of the needs of the ordinary general practitioner. It is not waste of time for a dresser to hold a retractor during a long complicated operation provided he be observant and allowed to handle diseased tissue in life. With the active circulation in being many abdominal conditions present a very different picture from that in the post-mortem room. Moreover, it is a nearer picture to that he must conjure up in treating the living man, for in the dead house the lesion has too frequently reached a stage incompatible with life. It is as essential for a dresser to handle an actual cancer in a living man as for a clerk to dissect a similar lesion in a corpse.

ATTAINMENT OF COMMON SENSE AND THE KNOWLEDGE OF HUMAN NATURE

Neither of these branches of knowledge can be taught as such but both can be acquired. From the considerations of the nature of common sense it can be seen how helpful it is to engage in some occupation which necessitates the attainment of some manual skill. It is the duty of those who have the welfare of medical students and of their future patients at heart actively to encourage the pursuit of some hobby, particularly one needing work with the hands. There must be a technique and one not too simple to acquire. The knowledge of the reaction of inanimate matter to change, the essence of common sense, can be gained in no quicker, more efficient, or pleasanter way. Every student with any surgical aspirations should at least have one or other hobby, artistic, mechanical, musical, but it must be executive. On the other hand, the social activities of a medical school should be carefully fostered—the games and other communal occupations. It is an error to consider that they have no part in medical education. The human contacts that they bring are of inestimable value. We cannot teach the knowledge of human nature, neither do we suggest in any other calling in life that instruction in it should be given. It is not possible to do so. We teach to engineering students the facts of engineering, to law students law, so we can only teach to medical students the facts of disease. But as it is more essential for them to acquire knowledge of the psychology of the man in the street, we must induce them to do so in the only possible way by encouraging the social side of the medical school. The hermit student may become learned but he will never become a good general practitioner.

THE FINAL WORD

It is a foregone conclusion that some reform of the medical curriculum is long overdue. There are many suggestions, too many with a utilitarian objective, which would defeat the aims of a true education and only lead to the production of an inferior type of practitioner. The considerations I have outlined aim at giving a man a proper intellectual outlook. Applied science will not always accomplish this. The problems of practice are so manifold, so varied, so unexpected that the utmost we can hope to do in preparation for it is to equip a man with a sufficiency of the facts of disease, but above all to provide him with those qualities of the mind which will enable him to attack them in an intelligent and effective fashion. If we keep these main aspirations in view it will surely not be impossible for the wise leaders of the different departments of medicine to select the essentials and eliminate the useless from an edifice which has become top heavy, overloaded, and disproportionately developed, and an unfair burden to the modern medical student whose quality has surely never in history been surpassed.

THE BLOOD-BRAIN BARRIER IN INFECTIOUS DISEASES

ITS PERMEABILITY TO TOXINS IN RELATION TO THEIR ELECTRICAL CHARGES

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(Concluded from p. 724)

5. The Electrical Charge of Toxins in Connexion with their Ability to Pass the B.B.B.

The problem which now presents itself is, why some toxins pass the blood-brain barrier and others do not.

At the beginning of our investigations this problem had been formulated only for very few substances. The well-known experiments on narcosis, on vital staining, and our previous studies on the B.B.B. suggest that the passage of chemical substances through the B.B.B. is favoured mainly by the possession of any one of three properties—viz., lipoid solubility, a high degree of diffusibility, and a basic character.

Lipoid solubility must be regarded as the quality to which narcotics owe their ability to pass the B.B.B. But lipoid solubility is not an outstanding quality of toxins, and there is no reason to suppose that differences in this quality explain the sharp differences between the two groups. Indeed, it is not certain that toxins are lipoid soluble at all. Some have thought that because certain toxins are absorbed by brain tissue they must be lipoid soluble, but other workers have argued that proteins and not lipoids, are responsible for the absorption. But whichever contention is right, we know that tetanus toxin is absorbed by brain tissue but cannot pass the blood-brain barrier.

That *diffusibility* facilitates permeation through the B.B.B. has been shown by Spatz [41] for acid dyes. Among basic dyes diffusibility seems to be of no significance. This factor can, however, be neglected when dealing with toxins. For all toxins are colloids and differ very little in their degree of dispersion.

Friedemann and Elkeles pointed out that among dyes and drugs *basic and acid character* have a dominant part in determining whether a substance shall or shall not pass the blood-brain barrier. It was already known to Ehrlich that nearly all basic dyes, with the exception of the triphenyl-methane group, when injected into the blood stream stain the brain. Some other basic dyes were found to do so by Wesselkin, Friedemann and Elkeles, and H. Schmid. Obviously these dyes pass the B.B.B. On the other hand, Ehrlich [43] supposed that acid dyes, with the exception of alizarin † and aurantia, do not stain the brain under the same conditions. According to Spatz that is not quite true of highly diffusible dyes. But, at any rate, they stain the brain very slightly, as compared with basic dyes, and the cerebrospinal fluid contains more of the dyes than the brain. Acid colloidal dyes leave the brain completely uncoloured when injected intravenously, but they do stain the brain definitely when the B.B.B. is circumvented or damaged. This was shown by Goldmann and Doinikow [43] for trypan-blue, isamin-blue, pyrrhol-blue, by Rosenbaum,[44] Stern, Kassil, and Lockschina [45] for Congo red. Inability of these dyes to stain the brain when injected into the blood stream is therefore exclusively due to their inability to pass the B.B.B.

Thus, in view of what is already known, it seems rational to suppose that amongst toxins, as amongst dyes, basic character may be found to favour passage through the B.B.B. and acid character to hinder. To arrive at the facts by direct methods is, however, difficult, as the chemical constitution of toxins is quite unknown. Basic and acid character is, however, well known to be associated with positive and negative electrical charges, which can be determined by cataphoresis. Cataphoresis experiments were therefore carried out on diphtheria-, tetanus-, botulinus-, and lamb-dysentery toxin and on cobra venom, in order to determine whether, according to their electrical charges, toxins fall into the same groups as they do according to their ability to pass the B.B.B.

The information we could gather from the literature on the cataphoresis of toxins is scanty. As far as we know, only ricin and abrin have been investigated (Landsteiner and Pauli [46]). They proved to be amphoteric colloids, their electrical charge being dependant on the pH of the solution. Bearing this fact in mind, our toxins were investigated in solutions of varying pH. Since, however, for our problem the electrical charge at the pH of the blood was of outstanding importance, only solutions of pH equal to 6·2, pH=7·4, pH=8·2 were used. They were prepared with phosphate buffers. Cobra venom, in addition to that, was investigated in a n/100 NaOH solution. The electrical current was passed for 40 minutes. Convection currents were avoided by adding 1–5 per cent. glucose to the solutions of toxins under investigation, in order to increase their specific gravities.

The toxicity of anode and cathode fluids was tested on a large series of animals; no detailed protocols are given. Before, however, proceeding to the results of these experiments a few points concerning the technique should be mentioned here.

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† Alizarin-blue too seems to be an exception to the rule. Ehrlich considered it to be an amphoteric dye and ascribed its ability to stain the brain vitally to its basic group. We found that in the electrical current it behaved like an acid dye; even in a n/10 HCl solution it passed to the anode. Keeping in mind the fact that in the blood it is present in colloidal form (Ehrlich), we can as yet give no satisfactory explanation for its ability to pass the B.B.B.

In experiments with diphtheria toxin the tests of anode and cathode fluids were made by subcutaneous injections into guinea-pigs of a standard weight of 250 g. In experiments with botulinus toxin the tests were made by intraperitoneal injections into mice. In experiments with tetanus toxin the potency tests were made by intramuscular injections in mice. The exceptionally high diffusibility of this toxin caused much trouble. Until we reduced the strength of our solutions to a suitable level toxin appeared in both arms of our apparatus, even when no current whatever had been passed. In the experiments with lamb-dysentery toxin our first attempts to test anode and cathode fluids were made by the intravenous injection of mice. These animals are very sensitive to the toxin, but we found them quite unsuitable for our purpose. Control experiments showed that intravenously injected cathode fluid was toxic to mice, even when plain saline had been substituted for the usual toxin solution. We failed to find the explanation of this toxicity, but the matter is of no importance for our present purpose. These difficulties could be avoided by using rabbits, into which the anode and cathode fluids were injected intravenously.

The results obtained in our cataphoresis experiments are summarised in Table V., in which "A" means that the toxin passed to the anode, "C" means that it passed to the cathode, and "O" that there was no change.

TABLE V

Toxins	pH 8·2	pH 7·4	pH 6·2
Diphtheria	A	A	A
Botulinus	A	A	A
Tetanus	A	A	A and C
Lamb dysentery	A	O	C
Cobra	C	C	C

Perhaps the first point to be discussed is the information our experiments give concerning the iso-electric point in the toxins investigated.

The iso-electric point was approximately determined for lamb-dysentery toxin at pH=7·4, and for cobra venom at a pH between 8·2 and the pH of a n/100 NaOH solution. These toxins, therefore, are amphoteric colloids. Our experiments give no information on the iso-electric point in diphtheria, tetanus, and botulinus toxins. All we can say is that apparently the iso-electric point was not reached within the range of phosphate buffers. But in the solutions of higher acidity these toxins are rather unstable. We shall see from the Table that at pH=6·2 tetanus toxin was found in both arms of the apparatus. We would not, however, assert with any certainty that at pH=6·2 the iso-electric point of tetanus toxin was reached. We have already remarked on the exceptionally high diffusibility of tetanus toxin, and there is the possibility that at pH=6·2 the diffusibility of the toxin is still further enhanced.

But for us the main interest in the tabulated results of the cataphoresis experiments is that they show clearly that, at the pH of the blood, there is a striking correlation between the electrical charge and the ability to pass the blood-brain barrier. Tetanus, diphtheria, and botulinus toxin, the three toxins of our series which are definitely known not to pass the B.B.B., were found to carry a negative charge; whilst of the two toxins definitely known to pass the B.B.B. one, the toxin of cobra venom, was found to carry a positive charge, and the other, the toxin of lamb dysentery, was found to be neutral.

Our results show that the behaviour of toxins fairly agrees with that of dyes and drugs, and confirm our opinion that acid and basic character or electrical charges are, in their case also, the dominant factors which control permeation through the B.B.B. It is impossible as yet to explain these results theoretically with any degree of certainty, as the more intimate mechanism of the B.B.B. is completely unknown. Explanations on the basis of Donnan equilibria or electrical potentials of capillary walls would be merely speculative.

It is, however, noteworthy that the electrical charges of toxins seem to be associated with another quality. The three toxins carrying a negative electrical charge fall into the group of toxins characterised by a long incubation period. Lamb-dysentery toxin and cobra venom, carrying either no charge at all or a positive one at the pH of the blood, act rapidly, without any significant incubation period. Obviously the rapidity of the action of these toxins is due to their facility to pass living membranes, and this facility depends upon their positive charges, or at least on the absence of a negative electrical charge. Here again an analogy to dyes may be stated. It is well known that basic dyes are very toxic, and, when given in sufficient amount, kill animals instantly, whereas acid dyes can be given in large amounts without toxic effects (Krebs and Wittgensteiner [47]).

The same inter-relations between the electrical charge, ability to pass the B.B.B., and readiness of passing from blood to tissues seem to hold for some drugs. Germanin, for instance, is known to exhibit no tendency to pass from blood to tissues, and therefore remains in the blood for weeks. We found it entirely unable to pass the B.B.B. Although almost innocuous when injected intravenously, it proved to be extremely toxic by the intrathecal route. Further, we found that Germanin carries a negative charge.

Discussion

The most important outcome of our studies, as we believe, is the demonstration that the blood-brain barrier plays an important and a hitherto overlooked part in the pathogenesis of infectious diseases. From a reconsideration of the literature and from experiments of our own, we have arrived at the conclusion that this barrier is impermeable to some toxins—e.g., diphtheria and botulinus toxin—which were hitherto generally supposed to owe their lethal effects to their actions on the brain. Further, it could be shown that toxins differ amongst themselves in their ability to pass the B.B.B. From this point of view toxins fall into two distinct groups, one of which, containing lamb-dysentery toxin and cobra venom, does pass the B.B.B., whereas the other, containing tetanus, diphtheria, and botulinus toxins, does not pass it. The toxins fall into the same groups when arranged according to their electrical charges. Diphtheria, tetanus, and botulinus toxin carry a negative charge at the pH of the blood, lamb-dysentery toxin is neutral, and cobra venom carries a positive charge. It would thus appear that a negative charge inhibits permeation through the B.B.B.

Our results apparently also have a bearing on the problem of the incubation period of toxins which hitherto has remained mysterious, except the case of the tetanus toxin. Diphtheria, tetanus, and botulinus toxins, which carry a negative charge and do not pass the B.B.B., follow the general rule that toxins exhibit a long incubation period. Lamb-dysentery toxin and cobra venom, which carry no negative charge, and pass the B.B.B., act rapidly, without any significant incubation period. From this and, as stated above, from experiments with dyes and drugs, we infer that the length of the incubation period is in some way connected with the readiness with which toxins pass from the blood to the tissues, and that this latter property depends on their electrical charge.

We have thus reached a point at which biological effects of toxins can be correlated to some physico-chemical properties which can be determined experimentally. Hitherto these effects could only be explained by hypothetical specific affinities of toxins for certain tissues according to Ehrlich's theory. We do not deny specific affinities between toxins and tissues. But electrical charge, determining the permeation through the B.B.B. and the length of the incubation period, is the predominant factor. There is little doubt that our results have also a bearing on drugs. They may become helpful in the synthetical production of drugs expected to pass the B.B.B., and therefore in chemotherapy.

The fact established by our studies that diphtheria toxin does not act on the brain involves a considerable change in our conceptions on the pathogenesis of this disease. It is reflected in a series of our own clinical, histological, and electrocardiographic researches, which were carried out together with our former colleagues, Profs. Anders and Brandenburg, at the Rudolph Virchow Krankenhaus, Berlin. A short review of these studies has been given in a lecture in the "Verein für innere Medicin," Berlin, in May, 1932.[48] A more complete account of the pathogenesis of diphtheria will be given by one of us in the "Handbuch der inneren Medicin," v. Bergmann and Staehelin (in press). In this paper only the main points are dealt with.

The action of diphtheria toxin was hitherto supposed to be mainly localised in the brain and in the heart muscle. We have now found that the brain is not involved in diphtheria. Vasomotor collapse, in our opinion, is due to the action of diphtheria toxin on the vascular system and its peripheral nerves. This opinion fairly falls in with the results of Harding,[49] Bricker,[50] Molinelli,[51] and Myers[52] obtained with other methods. The way is now open for a more intimate investigation of the mechanism of toxic action on cells, and we suppose that this way may lead to new and fundamental conceptions.

Moreover, the pathological changes of the vascular system have now become the central problem in the pathogenesis of diphtheria. It has been shown that the toxic action on the vascular system, merely functional in the first stages of the disease, results in definite histological lesions, cellular infiltration and hæmorrhage in the early stages, and widespread destruction of the vascular system in the final phase. These changes have been described before but with the exception of Bricker[50] and Molinelli[51] they have not been connected with the problem of pathogenesis. The consecutive stages in the development of vascular lesions, we found, correspond to characteristic clinical symptoms and electrocardiographic findings. The various features and stages of the disease could be brought into a system on the basis of their pathogenesis. Heart failure was demonstrated to be due, to a certain extent at least, to lesions of the coronary vessels. This has been clearly demonstrated by us for heart-block.

Our treatment of diphtheria has been profoundly influenced by our investigations. The intrathecal application of antitoxin recommended by Bingel[53] and Speranski on order to protect brain centres was discarded as useless (Friedemann, Lukas, and Schmerel).[54]

The administration of drugs expected to increase the irritability of the vasomotor centre was abandoned after we had become aware that this centre is not involved in diphtheria. In fact, we never saw any effect of this treatment. On the contrary we found that the application of hot baths is very helpful in the conditions produced by vasomotor collapse in diphtheria. The method has been described in a previous communication.[48] The effects of this treatment are striking even in the most severe cases, and not to be compared with those of drugs. Symptoms are improved at once and remain so for hours. The efficiency of this therapy, in contrast with the complete futility of drugs, strongly confirms our conception of the peripheral origin of vasomotor collapse in diphtheria. It is suggestive that the same beneficial effect of heat has been observed experimentally by Cramer and Gye[55] in reducing the action of the toxin of *B. welchii*, which resembles that of diphtheria toxin in producing vasomotor collapse.

6. Summary and Conclusions

1. The blood-brain barrier is localised in the walls of the cerebral capillaries. The permeability of the blood-brain barrier coincides with that of the cerebral capillaries.

2. The methods for testing the permeability of the blood-brain barrier are discussed. In our own experiments with toxins four methods were used; (*a*) artificial perfusion of the brain; (*b*) auxoneurotropic effect; (*c*) comparative determination of the lethal dose of the toxin by the intravenous and the intrathecal route; and (*d*) identification of the toxin in the brain after intravenous injection.

3. As a result of a critical re-examination of the literature, and of our own experiments, we have arrived at the conclusion that the blood-brain barrier is permeable to cobra venom and lamb-dysentery toxin, and impermeable to diphtheria, botulinus, and tetanus toxins. The property of the toxins of vibrion Nasik and vibrion El-Tor are not sufficiently known.

4. Amongst the toxins investigated the ability to pass the blood-brain barrier is correlated to electrical charge. Diphtheria, tetanus, and botulinus toxins which do not pass the blood-brain barrier carry a negative charge at the pH of the blood. Of the two toxins which pass the blood-brain barrier, lamb-dysentery toxin is neutral and cobra toxin carries a positive charge at the pH of the blood.

5. It is suggested by our experiments that the electrical charge of toxins has a bearing on the problem of the incubation period. The two toxins which are either neutral or carry a positive charge have no incubation period.

6. The importance of these results for the pathogenesis of infectious diseases is discussed in the case of diphtheria.

The greater number of the experiments described in this paper were carried out in the Rudolf Virchow Krankenhaus, Berlin. In some of these experiments we were kindly assisted by Dr. Edith Bülbring. The hospitality extended to us by the Medical Research Council enabled us to complete the work at the Farm Laboratories, Mill Hill. We wish to express our thanks to Dr. W. E. Gye and Dr. W. J. Purdy for helping us to prepare the paper for publication, and to the Notgemeinschaft der Deutschen Wissenschaft for financial support.

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ANEURYSM OF THE INNOMINATE ARTERY:

A TWENTY-THREE YEARS' HISTORY

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THE history is here recorded of an aneurysm of the innominate artery through a period of 23 years, during which the innominate artery was ligated and quinine urethane hydrochloride was injected with the object of preventing the aneurysm from rupturing through the skin of the neck.

Case Record

The patient, X, died in October, 1933, aged 63 years. He contracted syphilis in 1888 at the age of 17 years in Africa.

He was treated by ointment and pills. The treatment lasted about three weeks. A secondary rash was present for about two weeks. It is not clear why treatment was discontinued, but the doctor appears to have taken little interest in the case. From 1888 to 1910 the patient was perfectly fit and well. In 1910 he was engaged on a Canadian farm in heavy physical labour involving his arms in particular. This was followed by distress in breathing, high chest pain, and some pain in the back. Complete rest for a time relieved all the symptoms.

In 1911 the patient consulted one of us (R. D.) in Vancouver. There were definite signs of innominate aneurysm. The tumour extended above the inner half of the right clavicle and the pulsation was expansile.

Rest in bed for six weeks and five intravenous injections of salvarsan gave relief to the symptoms, and the physical signs were much diminished.

In 1912 X came to England and consulted one of us (C. M.). The Wassermann reaction was positive. Four injections of 606 were given, and early in 1913 three injections of 914. Mercury in the form of Hutchinson's pill was given for 18 months. The Wassermann reaction became negative after the administration of mercury but was positive after the injections of salvarsan. On March 11th, 1913, the X ray report was "an aneurysmal tumour of the innominate—very definite—with hardly any pulsation—slight dilatation of descending aorta." In April, 1913, he reported as feeling very fit, except for an occasional pain in the right arm. Some large veins were visible in the right infraclavicular region but otherwise there was apparently nothing abnormal. The supraclavicular pulsation had disappeared. He obtained a post under a public authority and successfully passed a medical examination before taking up his duties.

During 1914–18 the patient was engaged in strenuous war service in the North Sea. He had no leave and was perfectly fit and well, except that he was for a short time in Rosyth Hospital with bronchitis. In March, 1919, he complained of pain in the right arm and was admitted to hospital. An X ray examination was made: "On screen examination the aorta is seen to pulsate while the tumour does not pulsate. It has the usual well-defined outline suggestive of gumma in the superior mediastinum." The left brachial blood pressure was noted to be higher than the right. Later in 1919 he returned to Canada and resumed hard physical labour once more. The symptoms returned. High chest pain radiating to the right side of the neck and distress upon exertion were noted. He returned to England to be under the care of C. M. During 1922 and 1923 the Wassermann reaction was positive and antisyphilitic treatment with rest was resumed. The condition on this occasion did not become quiescent. The aneurysm increased in size in the neck and some dysphagia was complained of. There was displacement of the trachea to the left and a pulsating tumour above the right clavicle.

In 1925 the patient was admitted to St. Thomas's Home and came under the care of one of us (C. B.). At this time the aneurysm extended high up on the right side of the neck and there were prominent local bulges of the aneurysmal sac in the upper part of the anterior triangle and in the lower half of the posterior triangle. The upper border of the right clavicle was obscured by the fullness caused by the aneurysm in the lower part of the neck. Expansile pulsation could be felt from the median line in front to the trapezius muscle behind. Tracings of the temporal and radial arteries showed that the pulse in the arteries of the right side was smaller than the pulse in those of the left side, clearly demonstrating that the aneurysm was not aortic. The pupils were equal and there was neither dysphagia nor difficulty in breathing. Careful X ray studies were made especially with the radiographic screen:—

1. The arch of the aorta and the heart appeared normal.
2. The aneurysmal tumour involved the distal third or half of the innominate artery and its two branches at the bifurcation.
3. The proximal half or two-thirds of the innominate artery appeared not to be involved in the aneurysmal tumour. It was thought, however, that the artery was slightly wider than normal—that it was slightly dilated. The discovery that the proximal part of the artery was not involved in the aneurysm raised the question of operative interference.[1]

The problem of ligation of the innominate artery on the proximal side of the aneurysm was beset with difficulties. The long history of the aneurysmal tumour and of the syphilitic infection made it nearly certain that the tumour and the proximal part of the innominate artery would be found firmly fixed to the surrounding tissues. Further, the slight enlargement of the proximal part of the artery made it probable that the wall of the artery was thickened and more rigid than the normal arterial wall. Under such circumstances it might not be possible to close the lumen of the artery by means of a ligature.

These facts brought under consideration the possible value of a clamp.

Halsted had successfully occluded the thoracic and abdominal aorta in dogs by means of an aluminium clamp.

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[1] Compare remarks in two papers on ligation of the innominate artery—THE LANCET, 1902, ii., 1180; and Brit. Jour. Surg., 1922, ix., 438.

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He had also used this method in man.[2] The problem in the dog with healthy arteries and without adhesions to surrounding tissues was different from the one presented by the patient. The first clamp[3] designed was made from a walrus tusk presented for the purpose by the patient, but it was found to be too small, so a second ivory clamp was made from an elephant tusk. The clamp worked well in the post-mortem room. When the clamp was closed, an interval of 3 mm. was left between the blades. Allowing for the thickness of the arterial wall being 1 mm. there would be left an interval of 1 mm. between the intimæ of opposite sides. It was thought probable that the arterial wall was thicker than 1 mm. Even if the lumen of the artery was not completely closed by the clamp it was probable that the multiplication of the cells of the tunica intima would soon occlude the artery. Besides, it was not known how thick the wall of the innominate artery was, and it was no part of the operation plan to press the opposing sides of the artery firmly together. The length of the innominate artery of man is about 1¾ in. to 2 in. The diameter under distention is from 14 to 15 mm. The thickness of the wall during life is 0·51 mm. and when collapsed is 0·98 mm. So that as the distance between the clamps was 3 mm., more than 1 mm. was allowed for the probable increase of thickness in the wall of the patient's innominate.

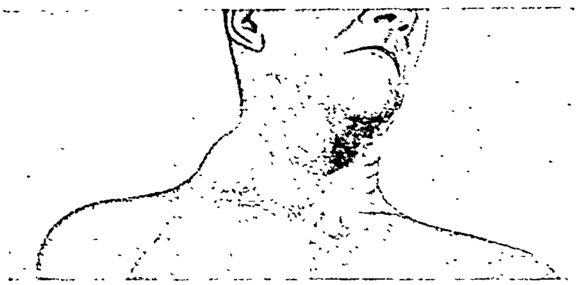

FIG. 1. *Appearance of the right side of neck* (Sept. 1st, 1933).—Prominent egg-shaped swellings occupied the right side of the neck. Expansile pulsation in them was visible and was readily detected by palpation. One large bulge was present in the upper part of the anterior triangle below the right side of the ramus of the jaw; another appeared at the lower part of the posterior triangle with a smaller swelling above it. The sternomastoid muscle was forced forwards especially above the inner end of the clavicle. The outline of the upper border of the clavicle was obscured. The depression of the skin in the region of the left side of the manubrium was caused by the removal of the left half of the manubrium and of the inner extremity of the left clavicle.

On Nov. 4th, 1925, the operation of ligature of the innominate artery was carried out.

The anæsthetic employed was ether and oxygen. The approach was necessarily from the left side. A long median incision was made. The inner extremity of the left clavicle and the left half of the manubrium were removed. This required a section of the cartilages of the left first and second ribs. The removal of these fractions of bone gave an admirable exposure. The edges of the pleura were coaxed away with moist gauze. The upper border of the arch of the aorta was defined and the left innominate vein retracted. In this manner the proximal part of the innominate below the aneurysm came into view. It only remained to apply the clamp or the ligature. But at this moment the difficulty of the operation became very prominent. The innominate was absolutely fixed by the surrounding tissues to which it was adherent. The tumour overlapped the artery above; and below was the arch of the aorta. With much patience and after some time had elapsed the aneurysm needle was passed around the artery. The tissue through which the aneurysm needle passed as it slowly encircled the artery appeared to be scar tissue, and during this time one did not know what catastrophe might not suddenly happen. The inflammatory tissue surrounding the artery was evidence that it was seriously diseased. It soon became clear that it was not possible to pass the clamp round the artery, and three kangaroo tendons were passed round it. The first half of the stay knot was applied and the ends pulled upon strongly. The rigidity and fixation of the arterial wall became then more evident than ever before. The artery was not quite, but nearly, occluded. All the time that the ligatures were being pulled on the possibility of rupture of the arterial wall or the wall of aneurysm at the point where it was continuous with the artery was present to the mind. The stay knot was completed and the wound closed. During the operation Mr. B. C. Maybury gave the most skilful assistance.[4] The pulsation in the neck as a consequence of the operation was not arrested but greatly diminished. In tying the common carotid artery with a stay knot of two strands of kangaroo tendon a pull of 1 lb. will occlude the artery but a pull of 5 lb. is required to rupture the coats. If three strands of kangaroo tendon are used a pull of 1½ lb. will occlude the artery but a pull of 9 lb. is necessary in order to rupture the coats. It will be noticed what a wide range exists between the force which is sufficient to occlude and the force which produces rupture of the coats. Other points of interest are that while the ligature is being tightened the elasticity of the artery assists and later resists; and that the blood pressure is rising as the artery being occluded as it is becoming a diverticulum of the larger artery of which it is a branch. The innominate artery is not quite double the size of the common carotid and the tension of its wall is much greater. The force required to occlude the innominate artery when three strands of kangaroo tendon are employed is about 3 lb., while the force required to rupture the coats is 10 lb. These facts are the result of experiments on the healthy arteries of man. The elasticity and other qualities of the arterial wall are profoundly modified by disease. In the case under review the wall of the innominate artery was thickened, rigid, and fixed to the surrounding tissues which vastly altered in an adverse manner the problem of surgical occlusion.

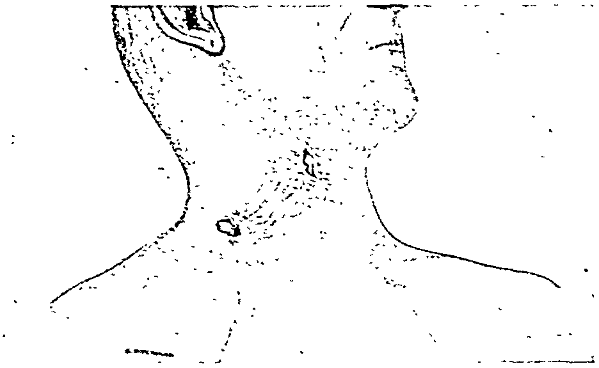

FIG. 2. *Appearance of right side of neck* (Oct. 17th, 1933).—Large masses of clot had been extruded through the openings in the skin. The skin of the neck has fallen in and has resumed its normal position. The outline of the upper border of the clavicle is visible. All pulsation has ceased. The interior of the aneurysm had been dressed daily for two weeks with ribbon gauze soaked in hot Beck's bismuth paste. The ends of the ribbon gauze dressing are seen protruding through the openings in the neck.

As the pulsation was not arrested, on Nov. 28th, 1925, the right common carotid was ligated under local anæsthesia, and on Dec. 8th the first part of the right axillary artery was ligated under local anæsthesia. It was not possible to ligate the third part of the right subclavian artery as the sac of the aneurysm covered it. The pulsation, though lessened, was not arrested by these two ligations. It was thought that the vertebral artery or other branches of the subclavian might be responsible for the continued pulsation, but these vessels were protected from surgical interference by the position of the aneurysmal tumour.

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[2] Surgical papers by Halsted, Baltimore, 1924, vol. i., p. 401.

[3] A note on this clamp forms an appendix.

[4] Mitchell Banks, in contrasting the ligation of the innominate artery with ligation of the first part of the subclavian artery, says that it was a mere surgical amusement. (Jacobson's Surgery, 10th edition.) We cannot entirely adopt this view!

On March 29th, 1926, the bulgings of the aneurysmal sac in the anterior and posterior triangles were treated by electrolysis. The effect was local and no general clotting occurred in the tumour. Nevertheless the patient was quite comfortable and seemed much better generally. On Oct. 27th, Nov. 26th, and Dec. 6th, 1926, the electrolysis treatment was repeated. These measures appeared to reduce in size the prominent portions of the aneurysm—the patient was comfortable and the pulsation of the main tumour was slight. During 1927 and 1928 the patient leading a sedentary life was quite well. Towards the end of 1928 there was a slight right hemiplegia but this soon cleared up. From 1928 to June, 1933, patient remained perfectly well while leading a sedentary life.

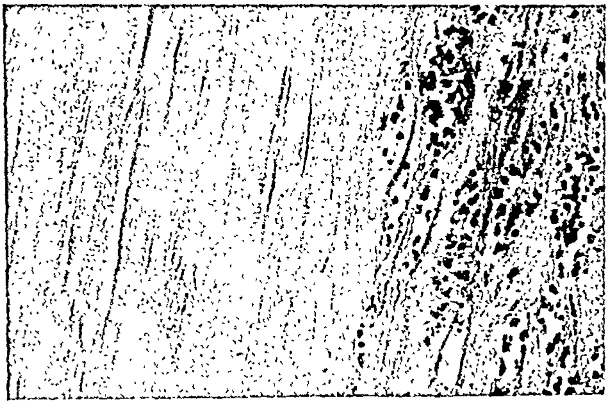

FIG. 3. *The wall of the aneurysm* (× 250).—The successive
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In June, 1933, after some physical exertion, pain returned in the upper chest and the right side of the neck. A large swelling gradually developed in the upper part of the anterior triangle, the size of an egg, a little distance from the ramus of the jaw, and another large bulge of the main aneurysmal swelling appeared in the lower half of the posterior triangle. (Fig. 1.) In August, 1933, in spite of absolute rest the skin over these swellings became congested and of a dusky purple colour. As the aneurysm threatened to rupture through the skin the patient was removed to a surgical home in London.

On Sept. 22nd an X ray examination was undertaken. The radiographic screen demonstrated that there was no pulsation at the site of innominate ligation nor in the thoracic portion of the aneurysm. The plates showed the local bulgings of the aneurysmal tumour in the neck. In order to anticipate the rupture through the skin it was decided to inject quinine urethane hydrochloride into the two bulging parts of the aneurysm. This was done on Sept. 12th, 13th, 20th, 22nd, 24th, and 26th, 2 c.cm. of the solution being used for each injection. The result was surprising—the skin over the swellings gave way, large masses of clot were extruded, no hæmorrhage occurred, and *all pulsation in the aneurysm ceased.* (Fig. 2.) The side of the neck became flat. The upper border of the clavicle was visible. On Oct. 15th the nurse reported that in the early morning the patient had some difficulty in speech. This, however, when the patient was seen, had passed away but there remained a complete right hemianopsia. The pulse tended to be rather quick and the temperature was above normal. Since the clot had been extruded the cavity of the aneurysm had been packed daily with ribbon gauze soaked in hot Beck's bismuth paste. The patient was cheerful, the surface of the neck was flat, and all seemed well when hæmorrhage occurred. This was repeated and he died on Oct. 20th.

Discussion

THE ONLY WAY IN WHICH AN ANEURYSM CAN BE CURED

Antonio Scarpa, emeritus professor of surgery in the Imperial and Royal University of Pavia, wrote 130 years ago that—

> "It is a certain and incontrovertible fact in practical surgery that a complete and *radical* cure of aneurism cannot be obtained in whatever part of the body this tumour is situated unless the ulcerated, lacerated or wounded artery from which the aneurism is derived is by the assistance of Nature, or of Nature combined with art, obliterated and converted into a perfectly solid ligamentous substance, for a certain space above and below the place of *ulceration, laceration or wound.*"

Since this bold statement was made its truth has never been disproved. We have failed to find the record of a single case in which cure has taken place in any other way. There does not exist in any museum we have visited a single specimen showing any other mode of cure, and it may be added that any exception to the rule is not to be expected from what is known of the processes which occur in the disease.

FORMATION OF THE ANEURYSM AND CONCERNING THE COAGULUM

The first step in the formation of an aneurysm is the occurrence of some injury or disease in the arterial wall, by which it becomes weakened and yields to the pressure of the blood within. A bulging occurs, round which, as round a foreign body, a capsule forms which constitutes the wall of the aneurysm, but this in its turn is not strong enough to resist the pressure of the blood, and the disease continues to advance. As it does so the shape of the aneurysm alters, and there arise in it bays and backwaters in which the blood circulates but feebly, and finally clotting takes place. As the aneurysm continues to enlarge another layer of clot is deposited internal to the first, and so on, the aneurysm gradually increasing, and successive layers of clot being deposited in its quieter parts. In this way the sac may become filled with laminated clot. Even so the aneurysm is by no means cured. There is a constant danger of the blood finding its way between the wall and the clot. The only thing that can obviate this danger is for the wall to become adherent, and the only way this can occur is by the extension of connective tissue growth from the wall into the clot. This does actually occur at certain parts of the aneurysm, but only at those places where there is perfect stillness, for the slightest movement of the wall on the clot will prevent the invasion of connective tissue cells, and therefore also the necessary adhesion of the clot to the wall. Experience shows there is always too much pulsation in an aneurysm for the adhesive process to be carried out effectively unless the artery on which it is situated is occluded at the site of aneurysm. The reason why the clot in an artery can become adherent is because it entirely fills the artery; all circulation and pulsation is arrested, and stillness is attained. When the same condition is produced in an aneurysm by the occlusion of the artery at the site of aneurysm, adhesion occurs between the wall and the clot. It must be remembered too that the intima of an artery is a more active tissue than the inner layers of the sac of an aneurysm, since in the latter the greater number of plasma cells have passed into a stage of quietude and encystment in fibrous tissue. In fact in an artery, just as in an aneurysm, it is necessary, if adhesion of the clot is to be established, that the vessel be occluded.

If the coagulation extend from the aneurysm into the artery, and this also becomes filled with clot, then all pulsation in the aneurysm ceases, invasion of connective tissue cells occurs over the whole extent of the clot, the absorption and substitution of the clot by connective tissue proceed concurrently throughout the whole thickness of the clot, which, together with the wall, becomes partly absorbed and partly converted into a mass of connective tissue. This gradually shrinks, so that after the lapse of years all that remains of the aneurysm is a small fusiform nodule of connective tissue. This last stage is well seen in John Hunter's fourth case of ligation of the superficial femoral artery for popliteal aneurysm 50 years after ligation. (Hunterian Museum, R.C.S., No. 3259.) In transverse sections of old and large aneurysms the clot is seen to be arranged in a very complicated manner. It is difficult to decipher its history, but the key to the general principle of its growth will be found in the study of the clot in smaller aneurysms and in those which have recently arisen.

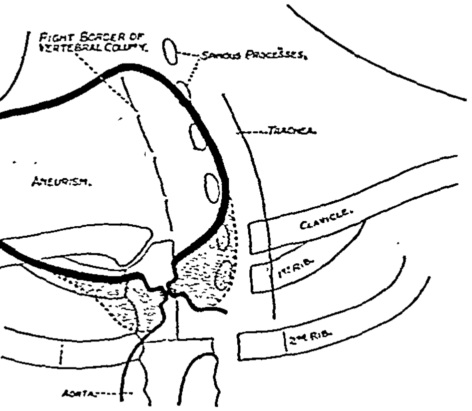

FIG. 5. *A composite diagram in part traced from radiograms.*—1925: The ligation of the proximal part of the innominate artery and the involvement of the distal portion in the aneurysmal tumour is represented. 1933: The innominate artery has disappeared. The aneurysm opens directly into the arch of the aorta. The stippled area shows the extension of the aneurysm in the direction of the aortic arch since 1925. The trachea is displaced to the left of the midline. Displacement and rotation of the vertebræ have taken place. A concavity is thus formed looking toward the right side. The spines of the vertebræ indicate the bend as does also the line of the right border of the vertebral bodies.

THE WALL

The wall of the aneurysm consists of coarse parallel fibres. With a higher power each of these is found to be composed of smaller fibres. Wherever a clot is adherent to the wall, connective tissue growth extends into the clot and the new fibres thus formed become in time part of the wall. (Fig. 3.) The same process occurs when a ligature is absorbed, the new tissue forms in and takes the place of the portion of ligature absorbed, and thus the capsule always closely surrounds the remaining portion of the ligature. Encapsulation does not arrest absorption. The successive fibrous lamellæ forming the wall of an aneurysm are separated by considerable intervals in which all that is seen is a little loose connective tissue. The existence of these wide spaces is due to the pulsation of the aneurysm, and in their presence the capsule of an aneurysm differs from the capsule of all non-pulsating foreign bodies. The capsule is formed under constant movement and is adapted to it. With each pulsation the fluid in the spaces in the wall is displaced, the fibrous lamellæ being pressed together.

EXAMINATION OF THE ANEURYSM

The right common carotid, the right subclavian, and the right vertebral arteries were successively connected with a water-power system (about eight feet high). No trace of fluid entered the cavity of the aneurysm. This was proof that the hæmorrhages could not have come from either of these arteries.

(*a*) *Anterior aspect of the specimen* (Fig. 4).—The arch of the aorta is much thickened and dilated. It measured 5 cm. in diameter instead of the normal 3 cm. The inner surface is irregular and nodular and round the opening of the innominate artery are calcareous plates. The diameter of the aortic opening of the innominate is 30 mm. instead of the normal 15 mm. Looking into the lumen of the innominate artery, or rather what is now the interior of the aneurysm, a concave mass of decolorised clot is visible. Its edges reach the sides of the opening. The concavity presenting towards the aorta is due to the rush of the aortic blood against it. The surprising fact is now revealed that the innominate artery has disappeared. It is in its whole extent the site of aneurysm. The aneurysm is now not an aneurysm of the innominate artery but an aneurysm of the aortic arch. The proximal part of the artery which eight years previously had been ligated and nearly occluded is now absorbed into the aneurysmal tumour, for the lower border of the tumour corresponds to the upper

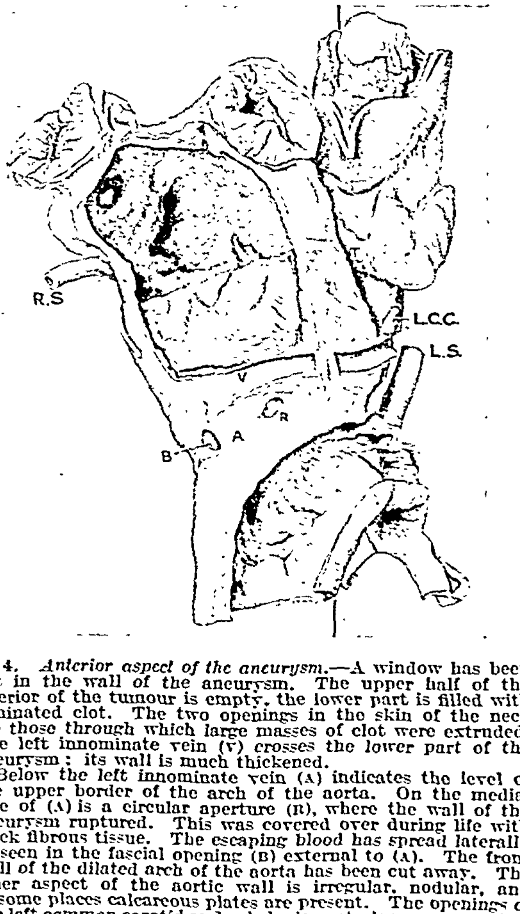

FIG. 4. *Anterior aspect of the aneurysm.*—A window has been cut in the wall of the aneurysm. The upper half of the interior of the tumour is empty, the lower part is filled with laminated clot. The two openings in the skin of the neck are those through which large masses of clot were extruded. The left innominate vein (V) crosses the lower part of the aneurysm: its wall is much thickened.

Below the left innominate vein (A) indicates the level of the upper border of the arch of the aorta. On the medial side of (A) is a circular aperture (R), where the wall of the aneurysm ruptured. This was covered over during life with thick fibrous tissue. The escaping blood has spread laterally as seen in the fascial opening (B) external to (A). The front wall of the dilated arch of the aorta has been cut away. The inner aspect of the aortic wall is irregular, nodular, and in some places calcareous plates are present. The openings of the left common carotid and subclavian arteries are encroached upon by the disease of the aortic wall.

The larynx and trachea are displaced to the left of the median line. The cartilages forming the pomum Adami appear somewhat twisted toward the left side. The right half of the thyroid gland (T) is compressed between the tumour and the cricotracheal region. The innominate artery has disappeared. It has been absorbed into the aneurysm which opens directly into arch of the aorta.

Lines above and below the specimen indicate approximately the middle line. L.S.: Left subclavian artery. R.S.: Right subclavian artery. L.C.C.: Left common carotid artery. (R.C.S. Museum: special pathology section. 5138-2.)

border of the arch of the aorta and the aortic opening of the innominate now leads not into the innominate artery but into the aneurysm. It may be surmised that the artery when ligated was already aneurysmal. (Fig. 5.) The clot in the inferior segment of the aneurysm is remarkably hard and except for an area posteriorly it is *not* adherent to the aneurysmal wall. Thus a narrow chink is present through which at times blood could pass or trickle. In the prepared specimen, from the lower border of the aneurysm to its upper limit in the neck, the measurement is 4½ in. The widest part of the aneurysm in the neck measures 3½ in. and the greatest antero-posterior measurement is 2¾ in. At the lower border of the tumour just above the arch of the aorta the wall had recently given way. This rupture was covered with thick fibrous tissue and if life had continued a new bulge of the aneurysmal tumour or a mediastinal hæmorrhage would have taken place. Above this rupture the left innominate vein spans the tumour. Its wall is greatly thickened.

(*b*) *Posterior aspect of the tumour* (Fig. 6).—The lower part of the tumour is moulded against the inner aspect of the right first rib and the right clavicle to the periosteum to which it is firmly attached. The aneurysm involves the whole length of the innominate artery and the origins of the right common carotid and right subclavian arteries. These latter, where they join the aneurysm, are filled with clot. It was not therefore feasible for hæmorrhage to have occurred from any vessel except the aorta. A window has been cut in the wall of the tumour. It shows the original course and position of the innominate artery. The surface exposed exhibits calcareous degeneration. This must be part of the tissue outside the clot (? tunica intima) since this regressive change does not take place in clot.

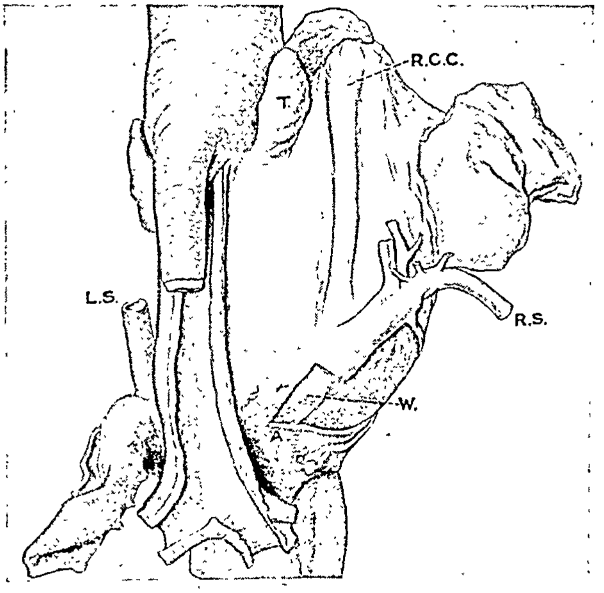

FIG. 6. *Posterior aspect of the aneurysm.*—The origins of the right common carotid and subclavian arteries are involved in the aneurysm. (A) indicates the level of the upper border of the arch of the aorta. A window (W) has been cut in the wall of the aneurysm to indicate the site and course of the innominate artery which has been entirely absorbed into the aneurysmal tumour. (In the drawing the window is shown much foreshortened owing to the fact that the wall of the aneurysm dips down deeply towards (A).) The larynx, trachea, and œsophagus are displaced to the left of the midline. The right half of the thyroid gland (T) is displaced and compressed. L.S.: Left subclavian artery. R.S.: Right subclavian artery. R.C.C.: Right common carotid artery. (R.C.S. Museum: special pathology section. 5438–2.)

THE FOREGOING CONSIDERATIONS AND THEIR APPLICATION

It is clear that the ligation in this case was not followed by the obliteration of the artery, so that as Scarpa's law was not fulfilled cure did not take place. The strong pulsation of the aneurysm was greatly reduced. It is tempting to think that for a time some control was attained over the disease, but the question remains is this conclusion true, or only a sentimental belief? Distal ligations were carried out because at the moment nothing else seemed possible to do for the patient. Distal ligation, however, is a fallacious procedure, for it causes the aneurysm to become a diverticulum of a larger artery and so the pressure within the sac is actually increased rather than diminished. In this case the pressure within the aneurysm became the pressure within the aorta.

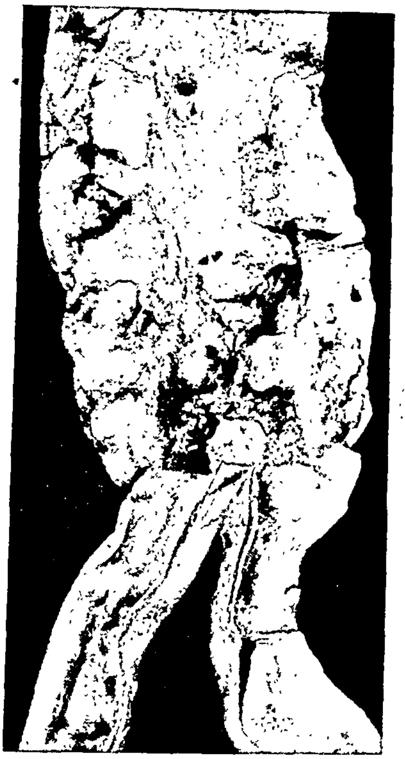

FIG. 7. *Inner aspect of abdominal aorta.*—Above the bifurcation and on the left side is an extensive ulcer (3″ × 1″) surrounded by calcareous plates. On the central side of the above ulcer and on the right side is another smaller ulcer. The remaining surface of the inner wall of the abdominal aorta is extensively diseased. (R.C.S. Museum: special pathology section. 5438–3.)

The tension of the arterial wall is directly proportional to the fluid pressure and to the diameter of the artery. The transverse tension is double the longitudinal. During the last few years of the patient's life the aneurysm became less amenable to treatment by rest and antisyphilitic remedies. This change probably coincided, in part at least, with the alteration in the arterial relations of the tumour. It was for many years an aneurysm of the innominate artery, but during the last years it was directly connected with the aorta—the aortic opening being 30 mm. in diameter. The pressure of the aortic blood is greater than that in the innominate artery. In a spherical aneurysm the tension of the wall is proportional to the fluid pressure and to the diameter of the sphere, but the tension is only half the transverse tension in a cylinder of the same diameter. These considerations explain the rapid rate at which some aneurysms grow and the rupture of others.

The case illustrates the fact that an innominate aneurysm usually commences at the point of strain—namely, the bifurcation—thus leaving the proximal portion of the artery at first unaffected, and making operative interference possible. The aneurysm was in its early stages in large part an aneurysm of the neck. The innominate arises on a level with the upper border of the second right costal cartilage and ascends obliquely upwards, outwards, and backwards. The bifurcation of the innominate is directly behind what Ward calls the superior angle of the inner extremity of the clavicle. The left border of the innominate artery appears in the neck immediately behind the middle of the episternal notch. At this point it is 1¼ in. from the surface, and from this point to the bifurcation (with the head slightly thrown back) measures ⅞ in., so that a good ¾ in. of the artery lies in the neck. The antero-posterior diameter of the upper opening of the thorax in the midline is about 2 in. This enables one to visualise the depth of the aneurysm from the surface when it first arose. The tumour would naturally spread in the direction of least resistance. In our case it spread upwards under the sternomastoid muscle, downwards into the mediastinum, and finally caused bulgings in the upper part of the anterior triangle of the neck and in the lower part of the posterior triangle. Both these sites of bulging are weak regions uncovered by muscle. Though the aneurysm had been present for twenty-three years, the autopsy did not reveal pressure erosion of any bone. There is a full inch of the first part of the right subclavian artery before branches are given off, so that it is easy to understand that the origin of the right subclavian can be involved in and occluded by an aneurysm without interference with the branches, and this is what happened in the case under review.

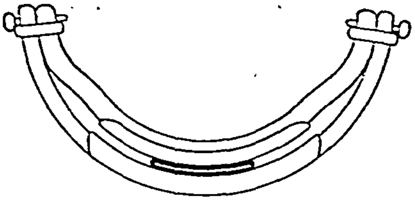

FIG. 9.—The ivory clamp closed and in position (½ nat. length). The inner arterial surfaces are nearly approximated.

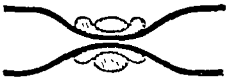

FIG. 10.—A vertical longitudinal section of the clamp and artery.

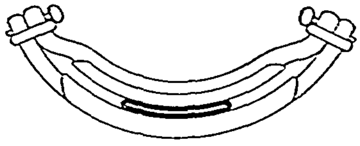

FIG. 11.—The clamp reduced in size (½ nat. length). It was obvious that the rails could be reduced in length without in any way altering the principles on which the clamp was designed. The result is seen in this Figure.

The patient suffered ten days and a week before his death from a moderate or small hæmorrhage which ceased spontaneously. Speculation was rife as to what small vessel was responsible for the bleeding. It was not known that the ligation of the innominate had failed, indeed the reverse appeared to be true, for the radiographic screen demonstrated that there was no pulsation in the chest above the upper border of the arch of the aorta. The bleeding came from the aorta. It is always well, whether the case be one of brain abscess or in this case one of aneurysm, to concentrate on the original site of disease. Otherwise the surgeon "vext with waste dreams" may be led astray and form erroneous ideas.

It was twenty-three years after the patient was infected with syphilis that the diagnosis of innominate aneurysm was made. The aneurysm was under treatment, with long intervals in which relief from symptoms was noted, for twenty-three years. (Fig. 7.) It is noteworthy that in the earlier stages of the disease rest and antisyphilitic treatment were most beneficial.

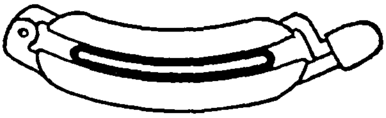

FIG. 12. *Clamp for innominate artery* (natural size).—The normal artery is 15 mm. in diameter. Allowing for enlargement by disease the clamp is designed for an artery 18 mm. in diameter. When flattened this artery would measure 27 mm. after allowing for a loss of length on the return at either end of the flattened artery. Length of saddles 37 mm.—this allows a margin of 5 mm. at either end.

Before the death of the patient the terrible incidence of syphilis on his arterial system was not and could not be known. On the other hand the heart and the valves of the heart were unaffected by disease.

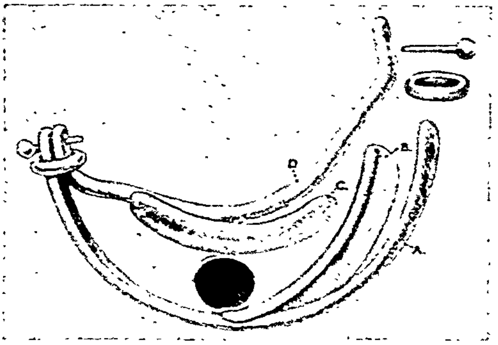

FIG. 8.—Components of the ivory clamp described in text (½ nat. length).

Treatment of the aneurysmal cavity.—The daily changing of the dressing within the aneurysmal sac after the extrusion of masses of clot was probably a wrong method to adopt. It is interesting to speculate what would have happened, for example, whether bleeding would have been prevented, if, when the clots had been extruded, the aneurysmal cavity had been filled with hot Beck's bismuth paste and no other dressing attempted. The frequent changing of the dressing, however gently done, may have displaced or loosened a fragment of clot from a channel leading to the aorta.

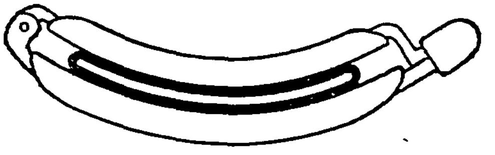

FIG. 13. *Clamp for thoracic or abdominal aorta* (natural size).—The arch of the aorta before the great vessels are given off is 3 cm. in diameter. At the bifurcation of the abdominal aorta the diameter is 1·75 cm. The aorta is diminished in size by the giving off of the large branches from the arch. Assuming that the thoracic aorta (being somewhat enlarged by disease) is 26 mm. in diameter, the flattened artery would measure 39 mm. The length of the saddles is 49 mm. This allows a margin of 5 mm. at either end.

In Figs. 12 and 13 the final design of the clamp is seen, the object being to reduce size and weight. The rails are further reduced in length. The rings and bolts are abolished. At one end a hinge unites the rails. At the other end the rails are brought together by a cap which screws on. The saddles are reduced in length so that they extend only 5 mm. at each end beyond the artery when flattened. The lower saddle still moves in its groove on the rail, but the upper saddle is fixed to its companion rail.

The Weights of Clamps in Ivory and Various Metals: Calculated.

	Clamp for 18 mm. artery (innominate).	Clamp for 26 mm. artery (aorta).
Ivory	1·34 grammes	2·70 grammes
Aluminium	2·41 ,,	3·68 ,,
Stainless steel	7·65 ,,	11·35 ,,
Nickel alloy	8·32 ,,	12·50 ,,
Silver: gold plated	10·50 ,,	15·32 ,,
Gold	18·71 ,,	27·80 ,,
Platinum-iridium	21·85 ,,	32·60 ,,

We are much indebted to Dr. Woods, of the pathological institute at the London Hospital, for the performance of a skilled post-mortem examination.

THE BRAIN

The following report was made by Mr. T. W. P. Lawrence, acting pathological curator of the Hunterian Museum of the Royal College of Surgeons.

The right vertebral artery exhibits a diffuse thickening of its wall, with reduction of the lumen to about one-fifth of its width by an abundant fibrocellular increase of the intima having the microscopical features of a syphilitic endarteritis. Two localised thickenings are present in the basilar artery, one at the bifurcation, the other near the commencement of the vessel. There is a localised area of endarteritis at the termination of the right internal carotid artery and at the commencement of the left middle cerebral artery. Slight atheromatous changes are present in addition in the internal carotid artery. In both vessels the lumen is partly obstructed by recent thrombosis, the clot consisting of a finely granular peripheral deposit next the vessel wall, enclosing a central cavity containing red blood corpuscles and leucocytes.

Recent softening of the grey matter of the cerebral hemispheres has occurred in the following situations: *on the left side*, in the middle two-fourths of the ascending frontal convolution with slight extension into the middle frontal, in the posterior part of the superior frontal convolution, the upper end of the ascending parietal convolution, and the upper part of the occipital lobe adjacent to the longitudinal fissure; *on the right side*, in the hinder part of the superior frontal convolution adjacent to the longitudinal fissure, in a somewhat ill-defined area above the middle of the parietal lobe, in the superior occipital gyrus, and in a small area at the extreme apex of the occipital lobe. In most of these situations there is only slight depression of the surface, but in the left ascending frontal convolution and the right upper occipital gyrus considerable depression has resulted from shrinking of the white substance. The pia-arachnoid over the depressions is slightly opaque; in other situations it is unaltered. In a horizontal section made through the left cerebral hemisphere the internal capsule and basal ganglia are normal in appearance. Microscopical examination of the softened areas of cortex exhibits necrosis and disintegration of the tissue, with reduction in the width of the grey matter, in some places almost to complete disappearance. In some sections a pial arteriole adjacent to the necrosed area is obstructed by a blood clot. The aorta is diseased in its whole length, apparently from a combination of syphilitic disease and atheroma. The aortic valves are normal. (R.C.S. Museum: special pathology section. 4947–2.)

Appendix

THE EVOLUTION OF AN ARTERIAL CLAMP (FIGS. 8–13)

Reference has been made to the intention of applying a clamp in this case for the occlusion of the innominate artery. Halsted has recommended for the occlusion of the innominate artery an aluminium band 1 cm. wide and No. 33 gauge in thickness. In his experiments the band was inveigled round the artery by a roller, the lumen of the band being gradually diminished so that it could act as a ligature. It was seen that if a large artery were occluded in this way the edges of the band might press unduly against the arterial wall, and it was decided to employ an ivory clamp. Such an instrument was manufactured by Messrs. Mayer and Phelps to the design of one of us (C. B.), and trials were made in the post-mortem room.

The idea underlying the design of the ivory clamp was to make an instrument which would bring the inner surfaces of the artery together over a wide area. It was thought also that the diameter of the circle of which the clamp formed an arc should be large. The diameter of the circle was fixed at 10 cm.

The clamp was thus applied.

The lower ivory rail (A) is passed below the artery. The saddle (B), on its grooved side, travels on the rail till its mid-point reaches the middle of the artery. The saddle (C) is then placed on the artery and the upper rail (D) laid in the groove of the saddle. Pressure is now applied to the upper rail till the rings and bolts at the ends of the rails can be fixed in position. When this is accomplished the saddle surfaces are separated by a distance of 3 mm. Each saddle surface lying against the outer wall of the artery is 2 cm. wide. The edges of each saddle are gradually rounded so as to present a smooth and wide surface to the arterial wall.

As will be seen from the record above, the clamp was not employed in this case, but as surgeons may find themselves in the presence of situations where such an instrument might be very useful, it has been thought well to describe it. The model clamp is now in the museum of the Royal College of Surgeons of England.

PREPARATION AND PROPERTIES OF AN ANTITHYROTROPIC SUBSTANCE

By Evelyn M. Anderson, M.D.

AND

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We have reported recently[1] the effect of prolonged injections of thyrotropic hormone in the rat; the lowering of the metabolic rate to the level of the hypophysectomised animal and the presence in the serum of these animals of a substance which inhibits the action of the thyrotropic hormone. Since then studies have been made on this inhibitory substance which has been produced in the serum of a horse injected with the thyrotropic hormone.

A 15-year-old mare has been used in this study. The serum from this horse before any thyrotropic hormone was given gave no evidence of inhibiting the effect of the thyrotropic hormone when tested upon the hypophysectomised rat (Table I.). After four weeks of daily intravenous injections the serum showed definite evidence of an antithyrotropic substance. In Table I. it is shown that 2 c.cm. of the serum completely inhibits a dose of thyrotropic hormone which is ten times the minimum effective dose for the hypophysectomised rat.

The effect of this antithyrotropic serum upon the metabolic rate of normal animals has been studied. A group of male rats five weeks old were injected with serum obtained from the horse which had received the thyrotropic hormone for six weeks. Another group received serum from a horse which had been given growth hormone for the same length of time. A third group received normal horse serum. If the metabolic rates of the experimental group in Table II. are compared with those of the two control groups, one sees suggestive evidence that the antithyrotropic serum has had a depressing effect on the metabolic rate of normal rats. We have found in our previous work that fairly large doses of thyrotropic hormone are necessary to raise the metabolic rate of rats; the converse of this may possibly be true—that large

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[1] Collip, J. B., and Anderson, E. M.: THE LANCET, Jan. 13th, 1934, p. 76.

TABLE I.—*Production of Antithyrotropic Substance in Horse Serum*

—	Serum: Daily dose (c.cm.).	Thyrotropic hormone: daily dose units.	Metabolic rate (per cent. change in O_2 consumption). Days— 1	2	3	4	6	9
Control serum from horse "By" taken before treatment with thyrotropic hormone was started. Tested on an hypophysectomised rat ..	2	20	+31	+57	+45	..	..	+27
Serum from horse "By" after four weeks of injections of thyrotropic hormone	2	20	−16	− 4	+ 7	−11	− 7	..
Tested on two hypophysectomised rats ..	2	20	−17	..	−19	..	..	0

TABLE II.—*Effect of Antithyrotropic Serum upon Metabolism of Normal Rats*

—	Animals.	Daily dose serum (c.cm.).	Metabolic rate (per cent. change in O_2 consumption). Days— 3	6	9	12	14	18
Experimental. Serum from horse "By" which had been injected with thyrotropic hormone.	6	1–2	−9	−14	−12	− 8	−11	−16
Control. Serum from horse "D" which had been injected with growth hormone ..	4	1–2	+7	+ 6	..	+ 9	− 2	− 5
Serum from horse "P" not injected ..	2	1–2	+2	+14	..	+17	− 3	0

This shows the lowering of the metabolic rate by the serum of horse "By" after six weeks' injection of thyrotropic hormone. Normal male rats 5 weeks old were used. The serum from a horse injected with growth hormone for the same period of time, and also normal horse serum, were used as controls.

doses of antithyrotropic substance are necessary to lower the metabolic rate.

We have evidence that the potency of the inhibitory serum can be greatly increased with prolonged injections of large doses of thyrotropic hormone. We have gradually increased the daily dose for the horse from 1000 units of the hormone at the beginning of the injections up to 10,000 units in the course of six weeks.

The antithyrotropic substance has been found to resemble insulin in its solubilities, and extracts of the potent serum have been made which are highly active. The most satisfactory method of preparing native protein-free extracts of the antithyrotropic substance is to precipitate from 92 per cent. acetone the 66 per cent. acetone-soluble substances of the fresh serum. In Table III. are reported the results of experiments in which the extracts of the antithyro-

TABLE III.—EFFECT OF ANTITHYROTROPIC SERUM EXTRACT ON METABOLISM OF NORMAL RAT

—	Animals.	Antithyrotropic extract.		Thyrotropic hormone.	Metabolic rate (per cent. change in oxygen consumption).												
					Days—												
		Extract.	Daily dose (c.cm.).	Daily dose (units).	1	2	3	4	5	6	7	8	9	10	11	12	13
Extracts of serum from horse "By" which had been injected with thyrotropic hormone for six weeks	3	A	4·0	100	..	− 2	− 1	+ 2	..	+ 1	..	− 2	..	..	− 4	..	− 2
	3	B	4·0	100	..	− 3	− 2	+ 4	..	0	..	− 6	..	..	− 6	..	..
	4	B	4·0	100	+ 9	− 1	0	..	+ 3	..	+ 9	..	..	+ 6	..	+ 9	..
	2	C	0·4	100	..	− 9	− 8	..	..	−12	..	−11	..	..	..	..	..
	2	C	1·0	100	..	−17	−14	..	..	−20	..	−10	..	..	..	..	..
	1	C	2·0	100	..	− 8	− 6	..	..	+ 4	..	0	..	..	..	..	..
	1	C	4·0	100	..	−24	−26	..	..	−24	..	−24	..	..	..	..	..
	1	C*	4·0	100	..	−17	− 8	..	..	+ 8	..	−21	..	..	..	..	..
	1	D	4·0	100	..	−13	−28	..	..	+11	..	−25	..	..	..	..	..
Serum from horse "By" (not extracted)	1	..	0·5	100	..	+12	+21	+10	..	+12	..	−18	..	..	+ 6	..	..
	1	..	1·0	100	..	−11	− 5	− 4	..	0	..	− 9	..	..	− 7	..	− 7

* Boiled.

It will be noted that extract C not only inhibited 100 units of thyrotropic hormone which were injected daily, but caused an actual lowering of the metabolic rate. Boiling extract C at pH 5 for three minutes destroyed its potency.

TABLE IV.—EFFECT OF ANTITHYROTROPIC SERUM EXTRACT ON METABOLISM OF HYPOPHYSECTOMISED RAT

—	Antithy. extract.	Thyrotr. hormone.	Body-wt. (g.).	Metabolic rate (per cent. change in O_2 consumption).					Autopsy findings.			
				Days—					Thyroid.		Adrenal.	
	Daily dose (c.cm.)	Daily dose (units).		1	3	5	6	8	Wt. mg.	Hist.	Wt. mg.	Hist.
Experimental. Extract C from serum of horse "By" ..	0·4	20	87	0	− 8	0	− 4	+ 3	11·5	Hyperplasia.	8	Atrophy.
	1·0	20	106	− 3	−18	−14	−26	−38	14·5	Cub. epith.	12	,,
	1·0	20	101	− 6	−16	−20	− 9	−38	9·5	,, ,,	8	,,
Control.	None.	20	95	+26	+ 7	+ 7	0	+21	10·0	,, ,,	12	,,

The metabolic rates of the hypophysectomised rats averaged 26 per cent. below normal before injections, which is evidence that the pituitary gland is completely removed. The control rat, receiving only thyrotropic hormone, was restored to its normal metabolism. The metabolic rates of two of the animals receiving the antithyrotropic substance dropped to a very low level. In spite of this the thyroid glands showed cellular activity.

tropic serum have been tested against thyrotropic hormone in normal rats. The amount of thyrotropic hormone used was fully five times the minimum effective dose. Extract C shows marked ability not only to inhibit the action of the thyrotropic hormone which was injected, but also to inhibit the thyrotropic hormone of the animal's own pituitary. A lowering of the metabolic rate to minus 26 per cent., which was produced in one instance, corresponds to the lowering of the metabolism which occurs in the hypophysectomised animal.[1] After boiling for three minutes at pH 5, extract C had no inhibitory effect upon the thyrotropic hormone.

TABLE V.—*Response of Thyrotropic-resistant Animals to Thyroxine*

—	Thyroxine.		Animals.	Metabolic rate (per cent.).
	Daily dose (mg.).	Days.		
Experimental.				
Animals injected from 40–70 days with thyrotropic hormone	0·01	9	4	+16
	0·02	9	4	+22
	0·04	9	3	+40
	0·08	9	3	+55
Control.				
Normal animals of same body-weight.	0·01	9	2	+27
	0·02	9	2	+25
	0·04	9	1	+48
	0·08	9	1	+60

The inhibitory action of extract C has been tested also on the hypophysectomised rat. The results are shown in Table IV. The thyroid gland in these hypophysectomised rats showed definite cellular activity which is worthy of special notice in view of the lowered metabolic rate. This is in agreement however, with our earlier observations on a larger group of hypophysectomised rats.[1]

TABLE VI.—*Showing Lack of Thyrotropic Hormone in Pituitary Gland of Thyrotropic-resistant Rat*

Date.	Pituitary glands.	Hypophysectomised rats—							
		PH.		YT.		YH.		VH.	
		Body wt.	Metab. rate (p.c.).	Body wt.	Metab. rate (p.c.).	Body wt.	Metab. rate (p.c.).	Body wt.	Metab. rate (p.c.).
Feb.									
6	2*	102	0	77	0	121	0	. .	. .
7	1*	102	0	. .	. .	. .	. .	. .	. .
8	2*	103	−11	82	− 2	. .	. .	. .	. .
9	0	102	+ 2	81	− 6	124	+7	. .	. .
10	0	105	+11	82	−19	127	+7	. .	. .
11	0	. .	. .	. .	. .	127	+6	. .	. .
12	1†	112	+ 4	87	−23	. .	. .	99	0
13	1†	115	+ 6	84	+15	. .	. .	100	+13
14	0	116	+ 6	85	+12	. .	. .	102	+ 6
15	0	122	+20	93	+18	. .	. .	112	+30

* Pituitary glands from rats treated with thyrotropic hormone for two months.

† Pituitary glands from normal rats.

The antithyrotropic substance has not inhibited the action of thyroxine in raising the metabolic rate. This has been tested on a group of rats which had been injected with thyrotropic hormone over a period of 40 to 70 days, and in which the metabolic rate was below normal. Graded doses of thyroxine, from 0·01 to 0·08 mg. daily, were injected. It will be seen in Table V. that the response to thyroxine characterised by a rise in metabolic rate is practically the same in the thyrotropic-resistant animals as in the control rats. This would indicate that the antithyrotropic substance which we have obtained is quite different from the antithyroidin of Anselmino and Hoffmann.[2] The substance which they describe was obtained in the lipoid-soluble fraction of an extract of normal blood and tissues. They have found that this substance when given by mouth inhibits the action of thyroxine.

The pituitary glands from animals which have received thyrotropic hormone for a long period, and in which the metabolic rates were depressed below normal, have been tested for the presence of thyrotropic hormone. The results of this study are given in Table VI. Three hypophysectomised animals were implanted with pituitary glands from rats which had received thyrotropic hormone for two months. Each animal received five pituitary glands, given over a period of three days. The metabolic rates showed no significant rise over a period of six days. On the sixth day two of these animals were implanted with fresh pituitary of normal rats. This was promptly followed by a rise in metabolic rate. A control rat receiving two normal pituitary glands showed a 30 per cent. increase in metabolism on the third day. The increase in body-weight during the period of treatment with the thyrotropic-free pituitary glands is evidence that the growth hormone was still present.

The question of where the antithyrotropic substance is formed has not yet been investigated. We have evidence, however, that it is not produced by the pituitary gland, for the hypophysectomised rat gives a response similar to that of the normal animal when injected with thyrotropic hormone. In a series of 30 hypophysectomised rats treated with thyrotropic hormone for one to two months the metabolic rate returned after one month to the level observed in untreated hypophysectomised animals.

SUMMARY

An extract of an antithyrotropic substance has been prepared from the serum of a horse which was injected with thyrotropic hormone. This substance has been shown to depress the metabolic rate of normal animals as well as to inhibit the action of thyrotropic hormone in normal and hypophysectomised rats. It does not antagonise the action of thyroxine. Hypophysectomised rats which have received the antithyrotropic substance in conjunction with thyrotropic hormone have a depressed metabolic rate associated with cellular activity in the thyroid gland.

ARTIFICIAL RESPIRATION FOR TWO YEARS

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THE case to be described is perhaps unique in medical history in that artificial respiration has been applied successfully and by unconventional methods for over two years.

The patient is a man of 63, who in 1926 felt loss of power in his fingers occasionally when he was driving a car or writing, especially when his hands were cold. Some months later he noticed that his shoulder muscles were thinner, so that he could feel his bones when carrying anything on his shoulder. In 1927 he noticed transient loss of power in his legs, but he was able to carry on his usual outdoor occupations until one day he attempted to jump from a bus and fell to the ground, as he was unable to control his legs. He was in bed some weeks and was seen by several doctors, who all diagnosed progressive muscular atrophy. Since that time the loss of function in his muscles has been slowly progressive, punctuated with temporary improvements and remissions of variable length. Complete loss of power occurred in his legs before his fingers. He had painless fibrillation in his muscles. He gradually lost weight. He could always feel pain and heat and cold, and he thinks that these sensations are more acute than formerly. There has been no incontinence of urine or fæces. In 1931 he noticed that occasionally he needed to help his breathing by pressing on his chest. In August, 1931, he had a serious attack of difficulty in breathing when riding in a car to which he had been carried. This was relieved by his companions performing artificial respiration by pressing rhythmically on the front of his chest. They were unable to perform it according to the Schäfer method, which they knew, because they could not shift a heavy paralysed man. Their efforts were successful, and the patient recovered his power of breathing after some minutes.

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[2] Anselmino, K. J., and Hoffmann, F.: Klin. Woch., 1933, xii., 99.

From this time onwards attacks of respiratory difficulty recurred, and were treated by his family in the same way. Gradually the attacks lengthened and the intervals shortened, until in June, 1932, he was having artificial respiration continuously day and night, performed in the same way by relays of relatives and nurses. This continued until September, 1933, when his friend, Sir William Bragg, O.M., F.R.S., suggested that some mechanical device might be substituted for this human effort. Sir William Bragg took two football bladders connected by a wide rubber tube, and while one was bandaged tightly to the man's chest, the other was fixed between two hinged boards, and one of these was fixed to the floor while the other was moved rhythmically by the foot or with a hand lever. This apparatus succeeded beyond all expectation from the patient's and the nurses' points of view. The football bladder lasted only three days as the rubber burst, and it was replaced by a hot-water bottle with the cork and tube through the top, used as an air-bag. These each lasted three weeks, after which they were replaced or patched. The boards were used until the hinges wore loose. A more substantial apparatus on the same principle was made by a firm of organ builders, but this proved too hard for the nurses to work. There was no electric supply available.

At Sir William Bragg's request, Mr. R. W. Paul, M.I.E.E., designed and constructed a small hydraulic machine worked off the main water-supply, which alternately compressed and relaxed a thick rubber bellows. This apparatus has been in successful use since October, 1933, except when on one occasion the water froze in the pipes. It was not in use for the full 24 hours each day at first as the patient could not bear the constriction of the bandage for more than 17 hours, so the original manual method was used for the remainder of the day. The air-bag was fixed over the left side of the front of the chest only. The front was used because it had originally been successful, and because the patient did not wish to live prone, and the left side only because an old injury made the right side hypersensitive to pressure. The patient found by experience that both sides of the chest and the abdomen moved even when pressure was applied to the chest very locally.

The hot-water bottle and binder have now been replaced, at my suggestion, by a belt of two layers of strong linen, interlined with a bag of thick rubber, with a tube coming from the lower front corner. The bag is of a size to surround the front and back of the left side of the thorax only. Both sides were not used on account of the desire to make changes slowly, especially as it was uncertain to what extent the right lung had been in action for some time. The larger area of this bag enabled a lower pressure to be used, and the belt is much looser than the bandage was. He has worn this comfortably and continuously, except when he is washed, for several weeks. With the hot-water bottle he found he required 1·2 lb. per sq. in. pressure, 22 times a minute, and 1·6 lb. per sq. in. if he wanted to talk a lot. With the larger bag 0·9–1 lb. per sq. in. was sufficient.

In his present condition the patient is very active mentally. He lies on his right side almost continuously, as he is not comfortable otherwise. He is very wasted. He is almost completely paralysed. He can, with effort, move the fingers of his right hand and the toes of his right foot. His speech is said not to be as clear as formerly. He has slight difficulty with swallowing. His appetite is good, but he finds he can manage liquids or solids alone at a meal better than both together. Pills are no longer given. His skin is loose on account of the loss of flesh, but is in good condition, and there have never been any bedsores. He says he has fibrillation sometimes in the region of the mouth, but now nowhere else. No supinator, knee, or ankle reflexes could be obtained. There is no sphincter disturbance. Normal breath sounds were heard on the front of the chest on both sides. Complete examination was impossible on account of the continuous artificial respiration. When the artificial respiration was stopped for one minute there was no movement at all in thorax or abdomen.

He had no serious illness previously. As a schoolboy he had a fall on his back which caused him to stay in bed some weeks. He complained of pain in the back in adult life. He led an active outdoor life up to the time of the present illness. He lost an eye due to an accident as a young man.

The method of artificial respiration by compression of the thorax was recommended by Dalrymple, and was the official method of the Royal Humane Society from 1833 until 1861, when Silvester's method was adopted. It was recommended that a drowned person should be laid on his back and a wide bandage passed beneath him, its ends being crossed in front of the chest. An operator on each side of the body constricted the thorax by pulling on the crossed ends, then relaxing their hold and allowing a recoil and inspiration to occur. In Schäfer's method, which is the classical emergency method in use to-day, positive pressure to promote expiration is employed, but instead of applying the pressure to the thorax, when properly executed pressure over the floating ribs compresses the abdominal contents against the diaphragm. The method has the advantage for emergency work that the supine position makes the tongue fall forward and keeps the airway clear. It is said that 50–90 lb. pressure is necessary for the Schäfer method. This is of the same order as that being used by this patient, with 1·2 lb. per sq. in. and a hot-water bottle 12 × 6 in.—i.e., 86 lb. With the larger air-bag, 15 × 10 in. and a pressure of 0·9 lb. per sq. in. the pressure is 135 lb. This is larger probably because part of the bag covers the less movable upper back part of the thorax and functions merely as an air cushion.

The positive pressure methods of artificial respiration have been supposed to work partly on account of the distortion of the shape of the thorax and diaphragm and their ability to recoil, and partly due to the nervous reflex by which an inspiration follows an expiration. In the present case the nervous reflex element cannot be helping on account of the nature of the lesion. Various methods have been suggested and used for prolonged artificial respiration in which the patient is put wholly or partly in a box or chamber in which the pressures can be altered (Thunberg,[2] Doe,[3] Steuart,[4] Eisenmenger,[5] Drinker and Shaw [6]). Negative pressure methods are theoretically more physiological, since inspiration is the active muscular phase in natural respiration The most interesting and instructive point about the present case is that positive pressure can be used without apparent ill-effects for a long period. The comfort of the patient and the simplicity and cheapness of the mechanism in the present case is very striking. The patient is in his own bed, carrying on his normal intellectual pursuits, and there are no nursing difficulties.

With a view to future development, the present method is being further investigated. A simple apparatus, which is electrically driven, has already been constructed.

I am indebted to Dr. W. T. Mills for permission to publish the particulars of his patient, and to the patient and his wife for their permission, interest, and help.

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PSEUDO-EPHEDRINE IN ASTHMA[1]

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AT the request of the Therapeutic Trials Committee of the Medical Research Council, we have carried out comparative clinical tests of the therapeutic value of ephedrine and pseudo-ephedrine[2] in asthma. The graphic formula of ephedrine contains two asymmetric carbon atoms, so that two sets of stereoisomers, making six in all, are possible. Only two occur in nature, *l-ephedrine*, which is the ephedrine in general use, and *d-pseudo-ephedrine*, which is usually known as pseudo-ephedrine. Different species of the ephedra plant contain different amounts of these two alkaloids, and there would be a great saving in cost if they could be used interchangeably. It has hitherto been believed that the action of pseudo-ephedrine is identical with that of ephedrine, but weaker (Chen and Schmidt, 1930).[3] In 1931, however, Chopra and co-workers[4] reported that ephedrine and pseudo-ephedrine were equally effective in the treatment of asthma, but that the latter caused fewer unpleasant side actions. This is the statement we have endeavoured to test.

Ephedrine is of little assistance in a severe paroxysm of asthma or in the status asthmaticus; but it usually aborts a mild attack if taken early, and it usually relieves a moderate dyspnœa. It is therefore a valuable drug in the treatment of asthma, as an intelligent patient can often stave off a severe attack by its use. The unpleasant side actions of ephedrine are familiar to all who treat asthmatic patients. Most common are palpitations, trembling, weakness, sweating, feelings of warmth, chilly sensations, nausea, and vomiting, and the tousse émétique. Less common are nervousness, headache, insomnia, dyspnœa, a tired feeling, thirst, drowsiness, precordial pain or distress, flushing, tingling or numbness of the extremities, anorexia, constipation, diuresis, and dysuria. These side actions are most evident at the beginning of treatment with ephedrine, and it is usual for tolerance to them to be developed and, for the patient to be able to continue the use of ephedrine with relief of the asthma and without the unpleasant side actions. In rare instances, however, toxic symptoms suddenly appear in a patient who has tolerated ephedrine well for months or years.

In the following experiments the relative value of ephedrine and pseudo-ephedrine has been assessed in two ways: (1) by the diminution in the number of attacks produced by continuous administration of the drugs; and (2) by the relief of the actual paroxysm by the administration of the drug at the onset of the attack.

PREVENTION OF ATTACKS

These experiments were carried out by one of us (G. W. B.) at the asthma clinic at the Hospital for Sick Children, Great Ormond-street, W.C. Twenty children, 12 boys and 8 girls, aged from four to nine years, were chosen who had (*a*) had their asthma for at least two years, (*b*) had attacks more or less all the year round, and (*c*) had not previously had hospital treatment. These children were divided into four groups of 5 children and observed during alternate control periods, periods while taking ephedrine regularly, and periods whilst taking pseudo-ephedrine regularly. The dosage employed was a quarter of a grain morning and evening for a child under seven years, and gr. ½ morning and evening for a child over seven years. The mothers were instructed to give an additional tablet whenever an attack threatened. During the control period all the children had two teaspoonfuls of water just coloured with burnt sugar three times a day. No other treatment, anti-asthmatic or otherwise, was given.

Group 1 had four months control period, four months on pseudo-ephedrine, and four months on ephedrine.

Group 2 had four months control period, four months on ephedrine, and four months on pseudo-ephedrine.

Group 3 had two months control period, two months pseudo-ephedrine, two months ephedrine, two months pseudo-ephedrine, two months ephedrine, and two months pseudo-ephedrine.

Group 4 had two months control period, two months ephedrine, two months pseudo-ephedrine, two months ephedrine, two months pseudo-ephedrine, and two months ephedrine.

By this means it was possible to compare the efficacy of the drugs with each other and with a control period without anti-asthmatic treatment, and at the same time to eliminate any seasonal variations that might occur.

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[1] A report to the Therapeutic Trials Committee of the Medical Research Council.

[2] The [illegible] in these tests was supplied to the committ[illegible] Wellcome and Co.

[3] Chen, [illegible] F.: Medicine, 1930, ix., 1.

[4] Chopra, R. N., Krishna, S., and Ghose, T. P.: Indian Jour. Med. Research, 1931, xix., 177.

The results are summarised in the accompanying Tables. Each figure represents the number of attacks of asthma during one month. The figures at the base of each group represent the total number of attacks the five children had during the month, and the single figure the total number of attacks the five children had during the control period, the period on ephedrine, or the period on pseudo-ephedrine as the case may be. The marginal figures represent the sex and age of the child.

In summary, the 20 cases during twelve months control period had 49 attacks; in eighteen months on ephedrine they had 78 attacks; and in eighteen months on pseudo-ephedrine they had 52 attacks.

Group 1

—	Control.				Pseudo-ephedrine.				Ephedrine.			
F. 6 ..	1	—	1	—	1	—	3	—	—	1	1	1
F. 8 ..	—	—	—	1	1	—	—	—	1	1	—	2
M. 5 ..	—	1	1	—	—	1	—	—	—	1	—	1
M. 9 ..	1	—	—	1	—	—	1	—	—	1	1	—
M. 7 ..	—	1	1	—	—	—	—	1	—	1	1	1
—	2	2	3	2	2	1	4	1	1	5	3	5
	9				8				14			

Group 2

—	Control.				Ephedrine.				Pseudo-ephedrine.			
F. 5 ..	1	2	—	2	2	2	1	1	—	1	—	1
M. 6 ..	—	1	1	1	1	2	2	1	1	1	1	2
M. 8 ..	1	1	2	1	2	1	—	1	1	2	2	1
F. 7 ..	1	—	—	1	—	1	—	1	1	—	—	1
F. 9 ..	1	—	1	1	—	1	1	1	—	1	1	—
—	4	4	4	6	5	7	4	5	3	5	4	5
	18				21				17			

Group 3

—	Control.		Ps.-ephed.		Ephedrine.		Control.		Ephedrine.		Ps.-ephed.	
M. 4 ..	—	1	1	1	1	1	1	—	—	1	—	—
M. 9 ..	1	1	1	—	1	1	—	—	—	—	—	1
M. 5 ..	1	2	1	1	—	3	1	—	1	1	—	1
F. 6 ..	2	1	2	1	1	—	—	1	1	1	1	—
F. 7 ..	—	1	—	1	1	—	—	—	1	1	—	—
—	4	6	5	4	4	5	2	1	3	4	1	2
	10		9		9		3		7		3	

Group 4

—	Control.		Ephedrine.		Ps.-ephed.		Ephedrine.		Ps.-ephed.		Ephedrine.	
M. 7 ..	1	—	—	3	—	2	1	—	—	—	—	1
M. 9 ..	1	2	1	1	—	1	1	1	1	—	1	1
F. 6 ..	—	2	—	1	1	—	—	1	1	—	—	1
M. 5 ..	2	1	1	1	—	1	—	—	1	—	1	1
M. 7 ..	1	2	2	2	1	1	1	2	1	1	—	2
—	5	7	4	8	2	5	3	4	4	1	2	6
	12		12		7		7		5		8	

Or, expressing the figures in the same ratio as regards time, control: ephedrine: pseudo-ephedrine = 100: 107: 73. In other words, whilst the administration of ephedrine did not diminish the number of attacks the administration of pseudo-ephedrine to the same cases and during the same period showed a 27 per cent. reduction of the number of attacks. As regards the severity of the attacks, they were most severe in the control periods, less severe whilst taking ephedrine, and least severe whilst taking pseudo-ephedrine in almost all cases.

Hence one may conclude that pseudo-ephedrine is a more efficacious drug than ephedrine in lessening the frequency of the attacks. Neither drug, if continuously administered, will prevent asthma. In two cases the asthma remained continuous in spite of gr. ½ three times a day in children of seven years. Hence, as both ephedrine and pseudo-ephedrine were used, and the attacks ceased immediately after 5 minims of adrenaline chloride solution had been given hypodermically, neither can replace adrenaline in allaying a severe attack.

One girl of ten years always had sickness and palpitation whilst taking ephedrine but not on pseudo-ephedrine. A boy aged eight years was always made sick by ephedrine gr. ½ but could take the same dose of pseudo-ephedrine quite well. A male of seven years became sick, languid, and listless after ephedrine gr. ½, and complained of palpitation each time. He took pseudo-ephedrine gr. ½ night and morning quite well for two months during which time he had one severe attack lasting four days. Though no sickness or palpitation occurred between attacks, during attacks the tablets made him sick each time for a quarter of an hour, but there was no palpitation. Hence one may conclude that pseudo-ephedrine is less toxic to children than ephedrine in the same dosage.

RELIEF OF PAROXYSMS

These experiments were carried out by L. J. Witts at the asthma research clinic at Guy's Hospital. The standard dose of ephedrine hydrochloride was gr. ½, to be taken as early as possible in the attack and to be repeated at hourly intervals if necessary until grs. 1½ had been taken. If relief was not obtained with this dosage it was rarely possible to improve the results by increasing the dose, on account of the supervention of toxic symptoms. In a few cases, however, the patient had an unusual tolerance for ephedrine, and occasional patients have taken as much as grs. 9 a day with benefit. An analysis of 60 adult patients, who used ephedrine in this way, was as follows:—

28 were relieved by ephedrine and experienced no unpleasant side actions.
23 were relieved by ephedrine but experienced unpleasant side actions.
7 were unable to take ephedrine on account of the severity of the reactions.
2 were totally unaffected by ephedrine.

It was soon found that pseudo-ephedrine had a weaker action then ephedrine. The standard dose of pseudo-ephedrine was therefore fixed at gr. 1, repeated at hourly intervals, if necessary, until grs. 3 had been taken. It was seldom possible for the patient to take a total of more than grs. 4½ of pseudo-ephedrine during an attack without the supervention of toxic symptoms. Reactions to pseudo-ephedrine, when a dosage larger than the standard was employed, were sensations of cold, shivering, dilatation of the pupils, insomnia, lack of energy, drowsiness, palpitation, nausea and vomiting, and dysuria. The side actions of pseudo-ephedrine are therefore the same as those of ephedrine, but nausea and vomiting are more common.

In the first place the therapeutic effect of pseudo-ephedrine was studied in 21 adult patients, who had previously used ephedrine. In 15 of these 21 patients the asthma was relieved by ephedrine, but there were moderately unpleasant reactions ; the remaining 6 patients were unable to take ephedrine on account of the severity of the side actions. The results with pseudo-ephedrine in these 21 cases were as follows :—

3 obtained relief from their asthma without any side actions.
5 obtained only slight relief from their asthma, but there were not side actions. Nevertheless these 5 patients preferred the stronger therapeutic action of ephedrine in spite of its disadvantages.
6 were unaffected by pseudo-ephedrine, either favourably or unfavourably.
7 experienced unpleasant side actions, and did not get the same relief of their asthma as with ephedrine.

These results were disappointing, for it had been hoped that pseudo-ephedrine might be a valuable substitute for ephedrine in patients who had experienced the unpleasant side actions of ephedrine. Of the 21 patients in whom ephedrine had produced mild or severe side actions or had failed to give relief, only 4 preferred the action of pseudo-ephedrine. And of 6 patients, who were completely intolerant of ephedrine, only 1 was relieved by pseudo-ephedrine. The test to which pseudo-ephedrine was submitted in this experiment was severe, for the patients were selected by the criterion that they had experienced unpleasant reactions with ephedrine. Pseudo-ephedrine was therefore prescribed to a second group of 10 cases, of whom 7 had not previously used ephedrine or pseudo-ephedrine, and 3 had been relieved by ephedrine without reactions. The results in these 10 cases were as follows :—

4 were relieved without reaction.
2 were slightly relieved without reaction.
2 were entirely unaffected by pseudo-ephedrine.
2 were not relieved and experienced unpleasant reactions.

The number of our cases is too small for percentages to have any great significance, but it would appear that ephedrine gives relief in about 85 per cent. of adult asthmatics and unpleasant reactions in 50 per cent. ; pseudo-ephedrine gives relief in about 60 per cent. of adult asthmatics and unpleasant reactions in 20 per cent. The therapeutic efficiency of these drugs is rather closely correlated with their toxicity, but in a few patients pseudo-ephedrine will relieve the asthmatic paroxysms when ephedrine has had to be abandoned on account of its unpleasant side actions.

CONCLUSIONS

(1) Pseudo-ephedrine given by the mouth was more efficacious than ephedrine in lessening the frequency of attacks of asthma in childhood. (2) Pseudo-ephedrine was less efficacious than ephedrine in relieving the actual asthmatic paroxysm in adults. (3) Pseudo-ephedrine is less toxic than ephedrine, but in large doses it may produce the same unpleasant side actions. (4) Pseudo-ephedrine is worthy of further trial in the treatment of asthma in childhood, and in the treatment of adults who are unable to tolerate ephedrine. (5) Neither ephedrine nor pseudo-ephedrine is as effective as injections of adrenaline in the treatment of the asthmatic attack.

EFFECTS OF TONSILLECTOMY ON ANTITOXIC IMMUNITY TO DIPHTHERIA
IN A RURAL POPULATION *

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IN 1916 Tomlin[1] suggested that tonsillectomy might reduce the incidence of diphtheria by eliminating a portal of entry for the bacillus and reducing the number of carriers of the organism. Following this suggestion, a number of clinical writers asserted they had never seen, or rarely had seen, diphtheria in children with tonsils removed. These statements were mere impressions, remembrances, or lack of remembrances, as the case might have been. They did not originate in carefully kept statistics. But in 1924 we began to deal with statistics carefully maintained.

In that year Doull,[2] working in the Baltimore schools, studied 224 cases of diphtheria. Of those 224 cases only 2 had been tonsillectomised. Doull says: "This is a very much smaller number than would be expected in a sample of this size selected at random from the school population. On such a basis the number to have been expected was 26."

In 1927 Collins and Sydenstricker,[3] in an epidemiological and statistical study of tonsillitis among school-children of Hagerstown, Md., reported that diphtheria was found 4·6 times more frequently among children whose tonsils were diseased than among those whose tonsils were removed.

Schick and Topper[4] in 1929 reported that of 300 tonsillectomised children in New York City, 81 per cent. were antitoxically immune to diphtheria, as determined by the Schick test. These children varied from two to twelve years of age. They were charity patients, and came from a highly congested area of the city. On the basis of their findings, Schick and Topper suggested that with more investigation it might be found expedient to resort to tonsillectomy to immunise against diphtheria.

Doull and Herman,[5] also in 1929, made some observations on adults which they have never published. They Schick-tested 232 medical students at Johns Hopkins University, their ages varying between 20 and 29 years. No significant difference was noted in the proportion of immunes among the tonsillectomised and among those with tonsils intact.

Geddie,[6] at the Mayo Clinic in 1930, tested 883 children of Rochester, Minn. Ages varied from one to eighteen. He reported no influence exerted by tonsillectomy on antitoxic immunity to diphtheria.

In 1931 Wheeler, Doull, and Frost[5] reported on a total of 710 children of the Baltimore schools. The children tested varied in age from five to fifteen. These authors reported no significant difference in proportions of antitoxic immunes among the tonsillectomised and among those with tonsils intact.

Shaw[7] Schick-tested 174 Chicago children in 1932. Of 155 in possession of tonsils, 31 per cent. showed antitoxic immunity. Of 19 without tonsils, 33 per cent. were immune.

In 1932 Bigler[8] also tested 470 children of Chicago. The subjects were tested before and after tonsillectomies were performed. Tests made six to nine months after the operations revealed that tonsillectomy and adenoidectomy exerted but little, if any, effect on immunity.

Dudley,[9] in a semi-isolated but not rural community (Greenwich Hospital School) in England, in 1931 reported the frequency of immunes in a tonsillectomised group was twice as large as in a group with tonsils not removed. He thinks that tonsillectomy in itself does not immunise but that in some way it accelerates latent immunisation by the diphtheria bacilli in the environment.

Burton and Balmain,[10] also in England, tested 682 children at Ilford (pop. 131,000) in 1931. They saw no

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* The writer is indebted to Messrs. Parke, Davis and Co. for the toxin used in the Schick tests recorded in this paper.

influence on immunity to diphtheria produced by removal of the tonsils of children in a residential, non-rural, non-congested area.

In Germany, Orosz and Kugler[11] in 1931 examined 161 tonsillectomised children between the ages of one and six. They found no relationship existing between tonsillectomy and immunity to diphtheria. They consider that fluctuations in the negativity of Schick reactions vary because of changing epidemiologic conditions at different times.

In October, 1932, Park and Kereszturi read a paper on the subject at hand in the annual meeting of the American Public Health Association at Washington. In a personal communication, Dr. Park says they noted no statistical difference in New York City children who had tonsils removed and who had tonsils intact.

Summarising, the data obtained by Schick and Topper and those of Dudley indicate that tonsillectomy immunises against diphtheria, but the findings in each of the other investigations do not indicate that the surgical operation results in such immunity. All these investigations were done in cities, except that of Geddie made in Rochester, Minn., which has a population of 20,000.

THE TESTS AT PULLMAN

The community.—The results being reported in the present paper were obtained in a rural or semi-rural population. These results were observed among school-children at Pullman, Washington. Pullman has a permanent population of 3400 and a college population of 3000 students who reside there from September to June inclusive. The town is located in a fairly densely populated wheat farming country of extreme eastern Washington, within five miles of the Idaho boundary. Many of the children in Pullman schools are transported daily from their farm homes. Nearly all the children are of Anglo-Saxon stock. Pullman is 80 miles removed from any town of consequence, and the population, therefore, has but little contact with urban populations. Only seven cases of diphtheria have been observed in the community during the last eight years. No case had been noted for two years preceding the tests.

Results.—A glance at Table I. reveals that Schick-positives were dominant over the negatives among those children having tonsils removed. The positives were also dominant in the children who had retained their tonsils. In each instance the percentage of positives was about twice as large as that of the negatives.

TABLE I.—*Comparison of Schick-positives with Schick-negatives in the tonsillectomised and in those whose tonsils were intact*

—	Number and per cent.
Tonsils removed—	
Schick-negative	42 (38)
Schick-positive	68 (62)
Tonsils intact—	
Schick-negative	38 (31)
Schick-positive	84 (69)
Total number tested ..	232

Table II. is an analysis by age of the children whose tonsils had been removed. It will be noted that the Schick-positives are dominant at all ages, which is in contrast with the findings of Schick and Topper[4] in New York City, but in agreement with Burton and Balmain's[10] observations among city children in England. This table indicates that tonsillectomy in itself does not immunise against diphtheria. The children of this rural community, with but little contact with urban populations, remain predominantly Schick-positive regardless of increasing age.

Table III. shows the percentage of Schick-positives found in the Pullman studies as compared with the percentage found by Zingher[12] in New York City, without regard to tonsillectomy. (Several other investigators working in large cities have agreed with Zingher.) Of course, at Pullman we are dealing with exceedingly small numbers, as compared with Zingher's. Yet, we are struck with the quite consistent trend of the positives, the general direction being toward greater percentage of positives with increasing age, as opposed to New York's decreasing percentage. To say the least, it does not appear that children in this rural community where diphtheria pays infrequent visits are attaining immunity as they grow older. It is hoped that we shall be able to present observations later to show the trend in Pullman at ages above 13, that is, through the high-school ages.

TABLE II.—*Analysis of the tonsillectomised by age*

Ages.	Number tonsillectomised.	Schick-positive. Number and per cent.	Schick-negative. Number and per cent.
6– 7	12	8 (66·6)	4 (33·4)
8– 9	37	22 (59·5)	15 (40·5)
10–11	43	28 (65·1)	15 (34·9)
12–13	18	11 (61·1)	7 (38·9)
Totals ..	110	69	41

Zingher found that children in the less congested areas of New York City showed 100 per cent. to 200 per cent. more positives than those in the more crowded areas.

Kidder,[13] working in a rural section of the State of Vermont where diphtheria prevailed yearly, showed Schick-positives in school-children there to be much greater in percentage than found by Zingher and others in large cities. Kidder's percentage of positives decreased with increasing age as follows: ages 5 to 9, 81·4 per cent. positive; 10 to 14, 75·4 per cent.; 15 to 19, 65·1 per cent. Children in the villages were 60 per cent. to 71 per cent. positive; while those residing outside of villages were 80 per cent. to 90 per cent. positive.

In Australia, Ferguson and Morgan,[14] working in towns "of less than 10,000 population" where diphtheria was rather rampant, found that an average of about 26·5 per cent. of school-children were Schick-positive. The percentage positive remained on an approximate level with increasing age.

TABLE III.—*Comparison of results of Schick reactions at Pullman with those in New York City as found by Zingher, disregarding the tonsillectomy factor*

Age.	New York City. Number tested.	New York City. Schick-pos. (per cent.).	Pullman, Washington. Number tested.	Pullman, Washington. Schick-pos. (per cent.).	Age.	New York City. Number tested.	New York City. Schick-pos. (per cent.).	Pullman, Washington. Number tested.	Pullman, Washington. Schick-pos. (per cent.).
3–5	1,328	58·6	..	..	11	17,994	28·2	46	73·9
6	13,754	50·4	23	56·4	12	16,254	26·6	29	65·5
7	16,180	43·5	10	50·0	13	..	..	7	71·4
8	17,136	36·6	28	67·8	14	..	..	2	..
9	18,065	32·2	40	55·0	15	..	..	1	..
10	18,057	29·3	46	73·9					

SUMMARY AND CONCLUSIONS

Rural school-children to the number of 232 were given the Schick test. They varied in age from six to fifteen years. Of the tonsillectomised, 68 (62 per cent.) were Schick-positive. Of those with tonsils intact, 84 (69 per cent.) were positive. Since we are dealing with small numbers this difference in percentage is not regarded as significant. Tonsillectomy does not appear to immunise children of this rural and much isolated community, in which only seven cases of diphtheria have appeared during the last eight years and in which no case of the disease was noted for two years prior to the beginning of the tests.

The proportion of Schick-positives among both tonsillectomised and non-tonsillectomised remained practically on a level through all age-groups. The children, without regard to the tonsillectomy factor, do not appear to be acquiring immunity to diphtheria as they grow older, which is in contrast with the findings of Zingher and other investigators working among children in large cities.

As one studies the figures obtained by Zingher, those obtained by Ferguson and Morgan, those of Kidder, and those of the tests at Pullman, it appears that the smaller the community and the less prevalent diphtheria the greater the proportion of Schick-positives at all ages.

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MEDICAL SOCIETIES

WEST LONDON MEDICO-CHIRURGICAL SOCIETY

AT a meeting of this society on April 6th, with Mr. H. TYRRELL-GRAY in the chair, Mr. B. SANGSTER SIMMONDS opened a discussion on the

Future of Nursing-homes and Private Wards in Hospitals

Formerly, he said, we were born, nursed, operated upon, and died at home; now there was a growing tendency for disease to be investigated and operations to be performed in institutions. Nursing-homes were available for those who could afford them, and some of the London hospitals had begun to set aside pay-beds, or had built wards for private patients, with accommodation at from 4 to 8 guineas a week. The number of these beds was still small, and hardly touched the problem of the patient of moderate means, but as hospital pay-beds increased the smaller nursing-homes would gradually feel the pinch and would ultimately disappear. The problem of accommodation for middle-class patients was therefore likely to increase rather than to diminish. Could the hospitals produce enough accommodation at moderate rates—say at 7 guineas a week—to provide for these patients? The luxury nursing-homes could not make a profit if they charged less than 12 guineas a week; at the London Clinic and Nursing Home it was possible to charge 10 guineas. Recently a scheme had been put forward to build a nursing-home of 600 beds to be available at 7 guineas a week with no extras; this could not be a success, he considered, unless it attracted a proportion of patients with chronic types of disease. The economic size for a nursing-home of the kind must be discussed; probably 600 beds were too many, 30 too few. When the economic size had been determined it might be possible to charge only 7 guineas in a mid-London area, but in the suburbs and provinces the cost would be greater. If built by private enterprise such homes should be established on the group system, with a parent institute in the West End and subsidiary homes in the suburbs. The other alternative was an extension of the pay-bed system at hospitals; the voluntary hospitals could probably provide accommodation at 7 guineas a week and make a profit. The present system was undesirable, however, in that the patient was taken from the care of his own doctor and placed under a member of the hospital staff. Was there any reason why the patient should not be treated by anyone he pleased, provided he was paying the whole cost, and that the hospital took no responsibility for treatment? Hospitals might well build extensions where general practitioners and consultants alike could send their patients and treat them. This was the principle followed at nursing-homes and at hospitals in the provinces and elsewhere in the Empire; why should it not be followed in London?

Dr. E. A. GREGG said that the hospitals had encroached so much on general practice that doctors were likely to look on any extension of hospital activities with suspicion. The medical profession had no right to claim anything which did not result in advantage to the community. How far would the scheme just outlined increase the efficiency of the general practitioner service? Probably considerably, if all that Mr. Simmonds had suggested came about, but Dr. Gregg was not sure whether it would. If the whole medical profession could coöperate in building nursing-homes of the right type it would solve the difficulty, but he doubted whether the best results would be obtained by approaching the scheme from the financial angle. Possibly we were pampering the public too much financially; the working class, for example, could afford wireless sets and visits to the cinema, but they had the idea that they ought not to pay for doctoring. The British Provident Association helped patients of moderate means to insure against illness, and the insurance principle might be developed to cover general practitioner services. Under any extension of hospital activities there was a grave danger that the general practitioner would be relegated to the position he now held in relation to pay-beds—he would have to resign the treatment of the patient to somebody else. He thought the medical profession should discuss the question thoroughly before recommending any scheme to the public.

Mr. W. MCADAM ECCLES said that there were 1300 pay-beds in connexion with 140 voluntary hospitals in the area covered by the King Edward Hospital Fund, and this number was totally inadequate for the number of people, in the same area, with intermediate incomes; probably three times as many beds were needed. Further accommodation of the kind could be provided either in wards attached to voluntary hospitals or in specially built home-hospitals in which the general practitioner could look after his own patients. In building such hospitals it would be necessary to provide for capital expenditure, upkeep, and a sinking fund. The British Provident Association was making provision for capital expenditure by means of its Founders' scheme. In an area, such as Ealing for instance, where there were 10,000 people of this intermediate class, 2 yearly in every 100 would need institutional treatment under their general practitioners, and beds and ancillary services ought to be available for them. A home-hospital must have the same facilities for diagnosis and treatment as a voluntary hospital, and these could only be provided at a capital cost of £1000 per bed. Such a hospital could not be maintained at the present time at a rate of less than 6 guineas a week per patient, and this was not a very high charge for a patient of moderate means provided he was insured; if insurance covered £5 he could pay the rest. A sinking fund was essential to keep the home-hospital in repair and up to date.

Dr. F. J. McCann thought the problem would be best met by building paying departments in connexion with hospitals. He did not think the introduction of pay-beds into the hospitals met the case, because the general practitioner lost his patient under that arrangement. There should be a separate building for the reception of paying patients, but they should have the advantage of the ancillary services of the hospital. He would like to see everyone insured against illness, but unfortunately many people were not insured, and, for these, 7 guineas a week was too much to pay; 5 guineas would be better, but it was impossible to cover expenses at that figure. He did not think pay-blocks could be run unless they shared in the capital resources of the hospital. He saw no objection to this; a great deal was done for the working classes but little for the professional and middle classes.

Dr. G. C. Anderson said that need for pay-beds had arisen owing to (1) the progress of scientific medicine, which had made institutional care necessary in many cases; (2) the domestic difficulties of the middle classes at the present time; and (3) the inability of the patient of moderate means to provide specialist services unaided. If pay-beds were to be provided by some system of insurance it was important that the scheme should allow all members of the medical profession to participate. The idea that it would be impossible to run a hospital if it was open to all practitioners was an old bogy. Not every practitioner wanted to become a surgeon; what he did want was to be able to treat his patient as he would in private and to be able to call in a consultant when he felt inclined. Restrictions about specialist service could easily be laid down. Pay-beds could best be provided in separate blocks attached to voluntary, municipal, or cottage hospitals. Schemes promoted by financiers were looking for too much profit; hospitals were the only bodies which could meet this need.

Dr. H. H. Sanguinetti said that at the National Temperance Hospital general practitioners were allowed to follow their cases into the wards. Voluntary hospitals were, in a sense, endowed for consultants. He would like to see someone endow a hospital where general practitioners could take in their patients and treat them.

Mr. Duncan Fitzwilliams said that insurance societies had a certain vogue, but nothing effective would be done on these lines until a government scheme was enforced by Act of Parliament. A patient earning 3 or 4 guineas a week, who might be in hospital for 10 weeks, could not afford to pay at the rate of 7 guineas a week; but backed by a government insurance service he could face this outlay with equanimity. He agreed that pay-blocks should be built in connexion with voluntary hospitals. If the government took over the care of the destitute, there was no reason why the voluntary hospitals should not help patients of the lower middle class, and he believed that charitably minded people would leave their money for this purpose in the future.

Dr. H. M. Stratford had reason to think that more patients could pay for treatment than chose to do so. The medical profession and the word "charity" seemed to be becoming synonymous. Patients expected to pay the cost of an illness out of income, but they must be prepared to pay for it out of capital. He thought that pay-beds should be provided in a separate institution attached to a voluntary hospital.

Mr. N. G. Loughnane, speaking as a layman, said that the essential factor was the capacity of the patient to pay. It was all very well to say he must pay out of capital, but very few people had any capital to-day. The man with an income of £800 a year and, say, two children, had practically no capital, and any that he had he guarded jealously. He might disgorge £100 for an operation if he was sufficiently frightened, but if there was any doubt he was likely to give the benefit of it to his capital and put off the operation indefinitely. Insurance was only a partial remedy. It was not the expense of nursing which frightened the patient but the expense of the operating surgeon. Mr. Loughnane suggested a fee of 10 guineas a week to include all nursing and treatment. In a hospital of 50 beds this would mean an income of £26,000 per annum. Operations might average four a week, and £5000 could be set aside for the remuneration of the surgeons; the nursing staff would cost £3000, the rent perhaps £1000. He could not see why such a hospital should not be self-supporting.

Dr. G. M. J. Slot said that, in London, nursing-homes were expensive and badly furnished and equipped. On the continent and in America they were well built and properly equipped. At the Mayo Clinic there was a standard charge of 10 per cent. of income for every patient. We should have to look forward to government assistance of patients of moderate means, because it was a government job to see that the health of the public was properly looked after. A charge of 7 guineas a week was too heavy for many people, and yet a barium meal, if it happened to be necessary, cost as much as that to begin with. There was nothing voluntary about the voluntary hospitals, except the services of the medical staff, and they only managed to exist on the sweated labour of nurses. He foresaw a municipalisation of the medical services of London.

Dr. Vaughan Pendred remarked stoically that the extension of various hospital services was bound to reduce the income of the general practitioner; demands upon him were greatly diminished and he must ultimately be extinguished.

The Chairman pointed out that the fees of the surgeon were not excessive considering that he lived for years on his own capital, that his heyday lasted only about 15 years, and that when he was ill his income ceased. He thought that the surgeon's fee frightened the patient unjustifiably; extra charges at the nursing-home were the things he should really fear. He thought that the weekly charge for pay-bed accommodation should be fixed and inclusive.

Mr. SANGSTER SIMMONDS and Dr. GREGG replied.

ROYAL ACADEMY OF MEDICINE IN IRELAND

AT a meeting of the section of obstetrics held on March 2nd, Dr. BETHEL SOLOMONS being in the chair, Dr. O'DONEL BROWNE read notes of a case of severe

Hyperemesis Gravidarum Treated by Jejunostomy

Here the condition was so urgent that immediate treatment was imperative. The patient was 30 years old and seven or eight weeks pregnant. On her first pregnancy she had aborted at the fourth month and some vomiting was present. The vomiting on this, the second pregnancy, had been severe for two and a half weeks before admission to a nursing-home under our care. She presented all the signs of advanced hyperemesis with acidosis, cracked tongue, sordes, and persistent vomit. Constipation was present and relieved by simple enemata. Retroversion of the pregnant uterus was treated and a support inserted. Salines were given, with glucose, by bowel and luminal as sedative treatment. During the first 48 hours treatment the condition disimproved so rapidly, with development of incontinence and restlessness, that fluids were imperatively and urgently needed. Further rectal administration was impossible, a suitable vein could not be found for transfusion, and subcutaneous saline would be too slow to help. Jejunostomy was performed under local anæsthetic. Continuous drip saline through a large rubber catheter into the duodenum commenced and was continued for four days. Glucose 10 per cent. was added and on the fourth day castor oil 2 oz. given by tube. Subsequent to bowel action, whey and other light feeding by tube. The progress of the case was altogether satisfactory. Vomiting ceased within 72 hours; urine excretion and bowel action were established; the jejunostomy closed and the patient sent home within two weeks. Further progress was normal except for premature stillbirth of normally developed fœtus. Large doses of luminal (2 c.cm. repeated three-hourly hypodermically) until restlessness was controlled, was regarded as most important. This, together with the immediate introduction of fluids with glucose, is regarded as the chief factor in the successful treatment of the condition. Jejunostomy is not recommended as routine treatment. It is, however, seen to be of the greatest value in such urgent cases. The opinion is, as regards emptying the uterus, that such treatment is useless in the majority of cases unless either the fœtus be dead or the operation be performed at a very early stage of the disease. In less urgent cases authors favour constant drip salines with glucose intravenously. This is best done by fixation of the leg on a splint and introduction of the fluid by the saphenous vein at the ankle.

Mr. J. OWENS said that when he first saw Dr. Browne's patient he thought the outlook was extremely bad. She was obviously very toxic, and there was acetone in her urine and in her breath. He opened the abdomen under local anæsthesia, through a left rectus incision. The vomit in this case was not examined for glucose. Since operating on this patient he had done two or three jejunostomies and had put in glucose and saline, and had had the vomit examined, and it had always contained glucose. It was possible to get in from 5 to 6 pints of a 5 per cent. glucose and saline solution in 24 hours.

Dr. NINIAN FALKINER referred to a case in which he had introduced glucose intravenously, and in which the response was very satisfactory. The patient was not, however, in such a serious condition as Dr. Browne's. Most cases of severe vomiting in pregnancy that he came across he treated in this way. If patients were seen before dehydration was advanced, the administration of lugol solution was often followed by a good result.

Dr. J. CUNNINGHAM said that these cases of toxic vomiting were very troublesome, especially in hospital practice, and he thought the reason was that they did not go to hospital soon enough. He felt that in teaching there was not sufficient stress laid on the importance of hyperemesis gravidarum. It was sometimes taught that abortion was part of the treatment of this condition. Abortion should not be necessary, and there had never been any indication given by anybody as to when abortion should be induced. If the patient had gone as far as having the liver damaged abortion would not do any good. He personally thought that the injection of corpus luteum and other such drugs was useless in the treatment of hyperemesis gravidarum. Patients required at least 5 pints of water per day, and if possible an effort should be made to give fluid by the bowel. If it could not be given by the bowel, it could be given either intramuscularly or intravenously. He asked if Dr. Browne had tried passing a duodenal tube in this case, and said he thought that having regard to the seriousness of the patient's condition Dr. Browne was quite justified in having a jejunostomy done.

Dr. J. S. QUIN said he thought most of the extreme cases of hyperemesis gravidarum were seen too late by a doctor. By the time they were seen they were usually suffering from a profound degree of dehydration with acidosis which had to be dealt with at once. The degree of toxæmia which was present killed the fœtus. In really severe cases the cause of the hyperemesis was usually not known. It was presumed to be due to a toxæmia, but where the toxæmia came from was not known. It should be borne in mind that vomiting was not a natural concomitant of pregnancy. He asked if Dr. Browne had considered the intensive alkalosis treatment for his patient, and referred to the possibility of some of those cases being due to psychological causes.

Dr. R. M. CORBET referred to the question of getting a tube out of the rectum into the colon, and said he would not try this with a patient who was in such a bad condition as Dr. Browne's patient, because it was a very difficult procedure and took a long time. He thought it could not be done properly without inserting two fingers into the rectum. This led to pulling a patient about a good deal, in some cases more than was justifiable. He had recently removed the corpus luteum of pregnancy from a patient who was six months pregnant, and she had not vomited at all. He had tried treating a case of dysmenorrhœa with nausea with Antuitrin S., and the result was that the bleeding became less, but the nausea and general discomfort became distinctly greater.

Dr. E. A. KEELAN referred to a case of his in which there was great distension associated with vomiting. Jejunostomy was done and the patient made a good recovery. But in a few days she miscarried. He also referred to another case in which there was severe vomiting for four days and intussusception. Jejunostomy was done and the patient recovered. He mentioned the necessity for teaching that vomiting in the early stages of pregnancy might be very dangerous.

The MASTER OF THE ROTUNDA said that cases of excessive vomiting were often found later in pregnancy as well as during the early stages. The pulse was, in his opinion, the real indication of the patient's condition. In one case of his recently there was albumin, and Fouchet's test was positive. She was given saline treatment. Her pulse kept going up slowly. After ten days, labour was induced at 34 weeks and a live baby weighing 4 lb. 3 oz. was born. Immediately after the birth vomiting ceased. He felt that but for induction of labour the patient might have died.

Dr. SOLOMONS said this was the first case of hyperemesis treated by jejunostomy reported from Great Britain and Ireland. In 1919 Prof. T. G. Moorhead had ascribed persistent vomiting after some abdominal operations to vagus shock with motor paralysis of the stomach and over-secretion from the stomach, and suggested when other treatments fail that the establishment of an enterostomy opening high up in the bowel might save some patients: this seemed to be the first published paper dealing with this matter. Sir William Wheeler had made the suggestion to him, but a suitable case had not appeared. To Mr. Owens, who had been Sir William's assistant, great credit was due for the excellent result in the case under discussion. Mr. Victor Bonney had advocated similar treatment for intestinal obstruction, which he believed to be due to spastic contraction of one segment of gut, with disturbance of gas production and gas absorption. Dr. Solomons went on to say that he had himself tried various treatments for hyperemesis; he had not had gratifying results either with intravenous glucose or intensive calcium treatment. He thought it was quite wrong to condemn entirely the evacuation of the uterus. All obstetricians could remember cases which could have been saved if the uterus had been emptied. Death after induction was due to the fact that the induction was carried out too late. There were many cases where the infant was dead, especially about 20 to 24 weeks, where minor Cæsarean section, either vaginal or abdominal, was a life-saving procedure. Induction took too long, and hysterotomy was attended with better results. The way to avoid deaths from hyperemesis was education, but he believed that the mothers of the patients required most education. They told these girls that vomiting was a natural part of pregnancy. In that way the specialist saw the case when it was very far advanced. Students had always been taught that vomiting was pathological. Institutions seemed to vary in their ideas as to what hyperemesis was, for the answer to a questionnaire he had circulated seemed to show that ordinary vomiting was sometimes considered as hyperemesis. He based his nomenclature on excessive vomiting, accompanied by constitutional symptoms and either the presence of albumin in the urine or a positive Fouchet test. Any colonic lavage or prolonged treatment would, in his opinion, have killed this patient.

Dr. BROWNE, in replying, said he had not done a Fouchet's test in this case because it was so urgent. He considered that albuminuria was a very bad sign.

LIVERPOOL MEDICAL INSTITUTION

AT a pathological meeting of this institution on March 22nd, with Dr. J. MURRAY BLIGH, the president, in the chair, a paper on some problems and investigations in the

Pathology of Fat Metabolism

was read by Prof. J. HENRY DIBLE, who described work he had carried out during the past few years. Fatty change, he said, was one of the conditions most often encountered in certain organs, particularly the liver, at post-mortem examination. It was frequently seen in wasting diseases such as infantile summer diarrhœa, and this apparent anomaly could be explained if the changes which occurred in the liver fat in starvation were understood. Experiments had shown that starvation caused a notable accretion of fat to the liver, but that the amounts were very variable and independent of the length of the starvation process. Careful quantitative investigations had shown that under similar conditions the quantity of fat infiltrating the liver in starvation was determined by the quantity of fat available in the animal's storage depôts. These results had been obtained in the first instance in the rat, but he and Dr. J. Libman had found them to apply also to the rabbit. Since in most illnesses there was an element of starvation in the terminal stages, it might well be that this was a major factor in inducing the common fatty degeneration, equally with poisons or anoxæmia. This question had been investigated with the help of Dr. W. W. Gerrard, and a definite relationship had been established, in man, between the quantity of fat appearing in the liver and the degree of inanition before death. In such cases a relationship had also been established between the degree of fatty infiltration and the adiposity of the subject. Turning to the question of fatty degeneration of the heart, Prof. Dible pointed out that in experiments carried out with Dr. Gerrard on phosphorus poisoning, a quantitative increase of fat in the degenerated cardiac muscle was constantly demonstrable. In work he had carried out upon the human heart in disease the same held good, very large increases being sometimes demonstrable and some increase, related to the histological picture, being constant. From a discussion of the histological changes in heart and liver showing fatty degeneration he reached the general conclusion that in both organs fatty change was of the nature of an infiltration, there being no evidence for the existence of the process usually called phanerosis.

MANCHESTER MEDICAL SOCIETY

THIS society held a joint meeting with the Liverpool Medical Institution at Manchester on March 7th. Dr. C. PAGET LAPAGE, the president, took the chair, and a paper on

Cerebral Pneumography

was read by Dr. HENRY COHEN. The method, he said, was based on two principles: (1) that no gross lesion can exist in the brain without deforming the fluid-containing spaces, with resultant changes in their size, shape, position, and communication; and (2) that it is possible to replace the cerebro-spinal fluid by air, by either the lumbar route (encephalography) or the ventricular route (ventriculography) and thus visualise accurately by radiography the normal or deformed fluid spaces. He described in detail the methods he employed in both encephalography and ventriculography and emphasised that the most notable contra-indication to encephalography was the suspicion of a subtentorial tumour. Ventriculography was necessary to define the ventricular system, however, if any obstruction to the passage of air from the subarachnoid space to the ventricles was present. In only a quarter of "tumour suspects" was cerebral pneumography required; occasionally it was useful to differentiate vascular lesions and degenerative processes from expanding lesions, but more often it was needed to help in the localisation of tumours which showed no localising signs or had given rise to false localising signs. Pneumography must always be subordinated to clinical examination, but it was helpful in practice and had thrown light upon the pathological basis of some of the epilepsies and traumatic "neuroses."

Immobilisation of Fractures

Mr. R. WATSON JONES (Liverpool) read a paper on Inadequate Immobilisation and Non-Union of Fractures. He believed that recent enthusiasm for early mobilisation and functional activity in fracture treatment was entirely justified, in that incapacity periods were reduced and many permanent disabilities avoided; but it should be recognised that joint mobilisation must not interfere with complete and uninterrupted immobilisation of the fracture. There was no more constant cause of non-union than inadequate immobilisation. Hyperæmia of bone caused decalcification, and if the initial hyperæmia of the trauma of injury was perpetuated by the frequently repeated trauma of movement of the fragments on each other, decalcification continued until a crack became a cavity, and a linear fracture became a gap fracture.

Even slight movement, and especially rotatory movement, was sufficient to account for excessive decalcification. The Whitman plaster for fracture of the neck of the femur did not as a rule prevent rotatory movement of the pelvis and head of the femur, and for this reason even in the 50 per cent. of cases in which union took place under this treatment, there was usually evidence of excessive decalcification in the shortening of the neck of the femur. On the other hand a Smith-Petersen nail completely prevented rotatory movement, and in the speaker's series of 28 subcapital fractures treated by operation, over 90 per cent. had united. In fractures of the lower shaft of the ulna, non-union was due to attempted restoration of radio-ulnar movement after six or eight weeks of immobilisation, before the fracture was consolidated. The radio-ulnar joint had become stiff so that the movement could occur just as easily at the unconsolidated fracture as at the stiffened joint. For this reason, in three years Mr. Watson Jones had seen 18 ununited fractures of the lower shaft of the ulna, although in every case the associated fracture of the radius—which was not subject to rotatory strain—had united. If these fractures were completely immobilised for the three or four months which were necessary to show radiographic evidence of consolidation, non-union never occurred. Fractures of the scaphoid bone in the wrist illustrated the same principle. Recent fractures usually united in six to eight weeks, but sometimes it was necessary to continue immobilisation for many months, and if the institution of treatment was delayed, twelve to eighteen months of absolute immobility might prove necessary. If the surgeon was prepared to wait for it, bony union could be secured in almost every case. The speaker's conclusion was, that whatever other factors might affect the union of fractures non-union was seen only if immobilisation was incomplete, or if it was not continued for a sufficient period.

REVIEWS AND NOTICES OF BOOKS

Legal Aspects of Mental Illness

Third edition. By WM. H. GATTIE, Barrister-at-Law. London: Shaw and Sons. 1933. Pp. 86. 7s. 6d.

WHEN Section 20 of the Mental Treatment Act substituted its sensible if copious euphemisms for the word "lunatic" in enactments and other official documents, nothing was said as to the word "lunacy." The Lord Chancellor still makes Rules in Lunacy, and the judges still speak of lunacy jurisdiction. Mr. Gattie, in his new edition of what used to be entitled "Lunacy Practice, Certification and Detention," acts in the spirit of Section 20 and entitles the book "Legal Aspects of Mental Illness." Having now to deal with the voluntary and temporary treatment introduced by the 1930 Act, the new edition is naturally of wider scope than its predecessors. There is also a new chapter on testamentary capacity. Here he suggests that the medical attendant, when satisfied that the patient is of sound disposing mind, should himself act as one of the witnesses to the will if the capacity is likely to be challenged. In this connexion the Christie litigation of a few years ago will be remembered.

Mr. Gattie's chapters are short and to the point. Forms, filled up as specimens, take up most of his space. He criticises the drafting of Section 5 of the 1930 Act wherein a temporary patient is described as one "who is suffering from mental illness and is likely to benefit by temporary treatment but is for the time being incapable of expressing himself as willing or unwilling to receive such treatment." In practice, he says, these words cover (1) persons so confused as to be incapable of expressing themselves by a simple affirmative or negative as willing or unwilling to receive treatment, and (2) persons totally devoid of the capacity to appreciate the meaning of submission to treatment. With such a construction, he adds, the section can be used only for a small percentage of cases; he would like to have seen a definition of "capable" and "incapable" in the Act if this restricted interpretation was intended. The obscurity is regrettable, but the draftsman could hardly have given a highly technical meaning to such simple words. The result perhaps places the more power in the hands of the medical experts who have to apply the phrase. The Royal Commission, on whose report the Act was based, distinguished two categories of mental disorder, the voluntary and the involuntary patients. The provision for voluntary boarders was to be limited to those who had volition, but the Royal Commission excused itself from defining the degree of volition to be attributed to persons who *ex hypothesi* are in a morbid state. The report described the involuntary patient as one "who is either without volition or is resistant and whose liberty must be infringed in order that he may be properly controlled and treated." For involuntary patients the Commission proposed two alternatives: (*a*) a provisional treatment order where there was a prognosis of early recovery, and (*b*) a reception order on full certification in other cases. What matters now, however, is what Parliament enacted, not what the Commission recommended. Mr. Gattie is a writer of authority on the legal aspects of this subject, and his little book will be found a useful work of reference.

Neuroanatomy

A Guide for the Study of the Form and Internal Structure of the Brain and Spinal Cord. Sixth edition. By J. H. Globus, B.S., M.D., Associate Professor of Neuropathology and Neuroanatomy, New York University and Bellevue Hospital Medical College. London: Baillière, Tindall and Cox. 1934. Pp. 240. 16*s*.

The popularity of this handbook is probably due to the original method by which it sets out to teach a subject generally regarded as difficult both by student and demonstrator. It is divided into two parts. The first is the text, which gives a concise description, illustrated by a number of good drawings and photographs, of the fundamental anatomy of the central nervous system. This description is interspersed with directions both for carrying out the dissections and for using to best advantage the second part of the work. This part consists of 53 plates on dull paper of serviceable opacity, forming an atlas of line drawings depicting different aspects of the brain, and sections at different planes and levels. It is intended that the student should complete these from his own observations. In a few examples the drawings are complete, and the student is invited to label the different structures shown. This is a great help to those who cannot draw and a saving of time to those who can. It would be difficult to imagine a pleasanter way of grappling with this particular branch of anatomy; anyone who conscientiously goes through the exercises provided in this book will almost certainly acquire a good working knowledge of the structure of the brain and spinal cord.

The Biology of the Protozoa

Second edition. By Gary N. Calkins, Ph.D., Sc.D., Professor of Protozoology, Columbia University. London: Baillière, Tindall and Cox. 1933. Pp. 607. 37*s*. 6*d*.

Most recent books on the protozoa have been written by protozoologists chiefly interested in parasitic or disease-producing forms. Dr. Calkins has devoted himself especially to the study of free-living protozoa, and this from the point of view of fundamental organisation and behaviour rather than that of details of structure and life-history. It is thus not surprising that his book deals primarily with biological phenomena as exemplified by the protozoa. Among the many subjects considered fully in the light of modern knowledge are cell-division, reproduction, fertilisation, sex differentiation, growth, vitality, maturity, senescence, and reorganisation. Naturally the author's own views, formed as a result of years of investigation, occupy a prominent position. Readers will be particularly grateful to him for this restatement of his convictions. Parasitic protozoa, more especially those injurious to man, are briefly considered in a chapter devoted to ecology, commensalism, and parasitism. This will form a useful summary for the general reader of what is known of these organisms, though a few slips and omissions here and there indicate that in this section the author is on comparatively unfamiliar ground. The last four chapters of the book are devoted to the special morphology and taxonomy of the four main subdivisions of the protozoa. These appeared in the earlier edition in the middle of the work, and their change of place is a distinct improvement. In each of the four chapters is included a key to the classification of the genera belonging to the group considered, which will continue to be of great use to protozoologists as a means of identifying genera.

Those who wish to understand the general principles underlying the science of protozoology and something of the complex organisation, development, and reproduction of unicellular animals and the laws which govern these processes cannot do better than read this book; it is well illustrated, and is a valuable contribution to the literature of the subject.

The Pocket Anatomy

Ninth edition. By C. H. Fagge, M.B., M.S., F.R.C.S. London: Baillière, Tindall and Cox. 1933. Pp. 333. 5*s*.

This thoroughly reliable little book will be as useful to students now as it was to their predecessors. The great change in this edition is the use of the "English" terminology, recently adopted by the Anatomical Society; this is the first general work to appear with this nomenclature. It is pleasant to be able to say that the first encounter leaves a favourable impression on the mind; not only are the terms sensible and applicable, but the language runs with more vitality and less restraint than when the terminology hitherto in common use was used. The change-over of this small classic to a language which appears worthy of general English adoption is a noteworthy departure, which will, we believe, be generally welcomed.

Metabolic Diseases and their Treatment

By Dr. Erich Grafe, Professor of Medicine and Director of University Clinic of Medicine and Neurology, Würzburg, Germany. Translated by Margaret Boise. London: Henry Kimpton. 1934. Pp. 539. 32*s*.

This book is translated from the first German edition and is probably the first substantial book in the English language dealing exclusively with metabolic diseases. An extensive bibliography is supplied and is conveniently arranged; the references are mostly to German work. After a few introductory remarks on general metabolism, the general functions of proteins, carbohydrates, fats, and vitamins are discussed, but hardly in sufficient detail. The metabolism and treatment of under- and over-nutrition is next considered; the section on obesity is prolix and rather vague. It is disappointing, in the discussion of the mechanism of fever production, to find no mention of W. Cramer's valuable theory of the importance of the thyro-adrenal mechanism.

About half the book is devoted to diabetes; the reason given for this allocation of space is that its therapy has now been successfully placed on a sure basis. The practical instructions for treatment here supplied, however, are of little help, although the underlying metabolic principles are adequately exposed and discussed. In this section also the references are overwhelmingly to German literature, though it is generally recognised that the main recent advances in both physiology and therapy have been published in the English language. This defect shows up glaringly in the pages of an English translation. Gout is dealt with in considerable detail and all the anomalies of metabolism are touched on, such as alcaptonuria, cystinuria, and so forth. A useful section on the "calcareous diatheses" is appended.

There are few serious omissions in the book, but a section on metabolic œdemas should have been included, and hæmochromatosis not have been dismissed in five lines. The task of compiling a comprehensive volume on metabolic diseases is probably an impossible one; the subject is too wide for one person to have a deep and critical knowledge of more than a small part of it. We trust that this book will stimulate the production of a more useful symposium; in its present form it is too large to be a primer, and too small to be a satisfactory work of reference. All the same, Dr. Grafe has rendered a considerable service to workers in this field by including in one volume a consideration of all metabolic diseases, which have so far usually been dealt with in separate monographs or reviews. The translation as a whole is seldom obscure in meaning, though many phrases used will sound strange to the English reader. The same cannot be said for the first introductory page, which is not English and hardly intelligible.

1. The 1933 Year Book of General Surgery

Edited by EVARTS A. GRAHAM, A.B., M.D., Professor of Surgery, Washington University School of Medicine. Chicago: Year Book Publishers. Pp. 826. 13*s.* 6*d.*

2. The 1933 Year Book of Urology

By JOHN H. CUNNINGHAM, M.D. Same Publishers. Pp. 445. 10*s.* 6*d.*

1. THIS volume, published quite early in the New Year, provides an excellent review of the contributions made to general surgery during 1933. It will prove of value not only to the surgeon who has been unable to keep up with current literature, but also to those who have noted advances but failed to remember the sources of their knowledge. The work owes much to the sound critical sense of its editor, who deserves credit for its timely appearance.

2. In his preface the editor draws from the literature of the year the conclusion that the urologist is now thinking and working in terms of broader understanding. Articles on certain features of biophysics and biochemistry, systemic infection, and changes in the central nervous system all indicate that urologists are realising more fully the necessity of avoiding watertight compartments, and of finding a correlation between diseases of the genito-urinary system and those of other parts of the body. A vast field of literature has been sifted and the editor has shown skill in epitomising that which is of value.

The Progress of Science

By J. G. CROWTHER. London: Kegan Paul, Trench, Trübner and Co. 1933. Pp. 304, 11 plates. 12*s.* 6*d.*

ABOUT a couple of years ago Mr. Crowther had the audacity to attempt a description of the universe in one volume—and not a very big one at that. He brought off a brilliant success of learning and exposition, and his new book deserves an equally warm welcome from those who like to know what is going on in scientific investigation. Six of the nine chapters are physical; they deal with heavy hydrogen, atomic constitution, research in Russia, the stars, and include a particularly attractive account of cosmic rays. That headed the Chemistry of Evolution comes largely from Needham's monumental book; the modern knowledge of plant pigments, the differentiation of embryos, and the molecular structure of organic substances are also described. Human Heredity is a salutary statement of what little we know. The final chapter gives a rather mediocre account of pernicious anæmia. Throughout the author emphasises the dependence of scientific progress on personality, and he points out its relation to social conditions with shrewd observations of much more than technical interest.

Virus Diseases of Plants

By JOHN GRAINGER, Ph.D., B.Sc. London: Humphrey Milford, Oxford University Press. 1934. Pp. 104. 6*s.*

THIS book is intended to serve as an introduction to the subject of plant viruses. Following a brief historical introduction, Dr. Grainger describes the symptomatology of these diseases, their pathology, mode of transmission, immunity, and so forth. Subsequent chapters deal with the properties of these viruses, insect transmission, economic effects, and measures of control and classification. The last chapter provides a general account of experimental work. All this is clearly and simply described, with a certain amount of technical detail, and some good illustrations. The term "virosis" is not a pleasing one, and "viroses" even less so. A mistake occurs on p. 31 in the recommendation to boil the filter in strong *caustic* soda after use. A list of over 400 references adds to the value of this useful little book, which has an adequate index.

REPORTS AND ANALYSES

ARISTON YAGHOURT

(ARISTON YAGHOURT CO., LTD., 19, STREATHAM HILL, LONDON, S.W.)

THE examination was confined to ascertaining the bacterial content of this material, which is a sour milk preparation for which various therapeutic advantages are claimed. *Direct films* show large numbers of gram-positive bacteria in two forms, large ovoid coccal bodies in pairs and short chains, and long stout curved rods. It is evident from cultural results that these are two forms of the same micro-organism.

CULTURES

(*a*) *Quantitative.*—Shake cultures in glucose agar made from a series of decimal dilutions and incubated at 37° C. indicate a living bacterial content of 290,000,000 per c.cm. Similarly made cultures in gelatin incubated at 22° C. yield no growth.

(*b*) *Qualitative.*—Surface-sown plates of glucose agar and litmus lactose agar incubated anaerobically yield a pure growth of a Lactobacillus; by its morphology, the failure of growth on agar, and its fermentation of maltose, this micro-organism is identifiable as *L. acidophilus.* It acidifies litmus milk in 24 hours, and subsequently produces the typical decolorisation of the lower part of the tube.

The keeping qualities of the material were investigated by making a further series of quantitative cultures nine days after receiving the sample. A growth of *L. acidophilus* in milk was obtained from quantities down to 1/100,000,000th of a c.cm., indicating that at least a large proportion of the bacilli had survived for that period.

CONCLUSIONS

The specimen of "Ariston Yaghourt" received is a pure culture of *Lactobacillus acidophilus.* In as far as milk soured by this micro-organism can be of service as a therapeutic agent, this preparation should satisfactorily fulfil the purposes concerned.

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* Proc. Roy. Soc. Med., Vol. II., No. 8, June, 1909. The Lancet, 1920, Vol. cxcviii, p. 1150.

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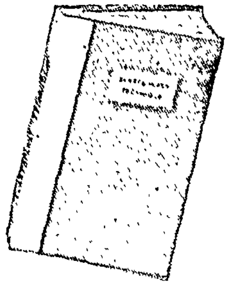

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THE LANCET

LONDON: SATURDAY, APRIL 14, 1934

INFECTIOUS DISEASES AND THE BRAIN

It sometimes happens in science, and especially in medical science, that what has been regarded as an axiom turns out to have been a hasty generalisation. For example, it has long been assumed that the symptoms characteristic of all fevers—such as apathy, insomnia, raised temperature, metabolic disturbances, vasomotor collapse, and eventually death—are due to disturbances of the brain centres produced directly by bacterial toxins. Prof. Friedemann and Dr. Elkeles, in the paper concluded in our present issue, throw doubt on the validity of this assumption.

Whether bacterial toxins do or do not act on the nerve-cells of the brain must obviously depend in the first place on whether they are able to reach these cells, although other factors such as chemical affinity will play a secondary part. The problem is bound up, therefore, with the problem of the exchange of substances between blood and brain. The work of the last few years has shown that this exchange is regulated by a selective mechanism, described by continental writers as the "barrière hémato-encéphalique" or "Bluthirnschranke," or in English as the "blood-brain barrier," or B.B.B. In the brain, as in other organs, the selective mechanism is localised in the walls of the capillaries; in this case it is in the cerebral capillaries, and not, as was formerly thought, in the choroid plexus and the meningeal vessels. Friedemann and Elkeles have devised new methods of testing the permeability of this barrier for various toxins, and their results show clearly that the toxins differ among themselves in the facility with which they pass through it. Those of the botulinus, diphtheria, and tetanus organisms, for instance, do not pass the blood-brain barrier at all (tetanus is, of course, exceptional in reaching the brain by another route, through the peripheral nerves). On the other hand, there are some, such as lamb-dysentery toxins and cobra venom, which definitely do go through the barrier. The two groups differ also in another respect: those that are able to pass the B.B.B. produce their lethal effect rapidly, whereas those that cannot pass the B.B.B. require a period of incubation. If this tentative generalisation should be found to hold good for all toxins, it will mean that few bacterial toxins act on the brain; for we know that most of them require a period of incubation. On further inquiry into the property of the toxins which govern their ability to pass the blood-brain barrier, it was found that those that could not pass the barrier carry a negative charge, while those that could pass it are either neutral or positively charged. It follows from this that differences in the length of the incubation period characteristic of different toxins depend on their electrical charge.

The subject is highly technical and may at first sight seem somewhat remote from practice. Prof. Friedemann, however, is not only a laboratory worker but also a clinical authority on the treatment of infectious diseases, and his investigation has clearly arisen as an attempt to account for the clinical features of these diseases and also for failures in their treatment. The handling of diphtheria, for example, is to some extent based on the assumption that the toxin has a direct localised action on the brain and also on the heart muscle, and Friedemann's treatment of it has been profoundly influenced by the results of his laboratory studies. Since vasomotor collapse, which is an outstanding feature of diphtheria, has been ascribed in the past to a paralysis of the vasomotor centre, it has been treated by drugs expected to stimulate the centre; though Friedemann says he has never seen any good come from such remedies. But if diphtheria toxin does not reach the brain, the vasomotor collapse must be of peripheral origin and must be treated accordingly. With this in view he instituted in Berlin its management by means of hot baths, and he claims that "the effects of this treatment are striking even in the most severe cases, and not to be compared with those of drugs. Symptoms are improved at once and remain so for hours." According to his new conception of the pathogenesis of infectious diseases the toxins of many other infections should produce their effects peripherally and not centrally, and it may be expected that a better understanding of their action will lead to further improvement in their treatment. The Medical Research Council is to be congratulated on having enabled Prof. Friedemann to continue his work by providing him with laboratory facilities in London.

A GENERAL MEDICAL SERVICE

The official report of the annual meeting in Llandudno last September of the National Conference of Friendly Societies contains a scheme for a general medical service submitted by its executive committee. The services proposed were comprehensive, covering treatment by a family doctor, medicines, nursing in the home, provision of consultants, specialists and auxiliary means of diagnosis (presumably pathological) through the general practitioner, home hospitals in which general practitioners would treat their own patients and meet one another in friendly consultation, residential accommodation in hospitals, sanatoria, and convalescent homes, and such other medical and allied services as may from time to time be arranged. In addition to insured persons as defined in the National Health Insurance Acts, persons who would be insured but for the fact that they are following excepted employments would become compulsory contributors, and voluntary participation would be extended to all members of friendly societies. Further, dependants of all such persons would be brought into the scheme and an arrangement would be made with county and county borough councils to delegate their obligation to afford medical assistance to the poor to the enlarged insurance medical service. Some arrangement for a maternity service and the incorporation of the present dental and ophthalmic provision would be made as soon as possible.

The proposals so far, it will be observed, agree generally with those made in 1930 by the British Medical Association.[1] On the administrative side, however, there is a definite divergence of view. The B.M.A. favours a complete coördination of domiciliary and consultant practice, laboratories, hospital and nursing provision with the existing official services of a medical character, under the control of a statutory committee set up by county and county borough councils, to be known as the "Medical Services and Hospitals Committee" and composed of representatives not only of the present health, education, mental hospitals, mental deficiency, and public assistance committees of these councils, but also of bodies of persons rendering service under the scheme. The administrative officer would be the medical officer of health, and there would be central and local consultative medical committees. The conference of Friendly Societies does not subscribe to these suggestions. Its scheme adumbrates a sharp division between what is called a "health service" directed to the prevention of disease and a "therapeutic service" devoted to the relief of individuals. Although it is not specifically said, it would appear to be implied that the latter would include some of the clinical services now administered by local authorities, including domiciliary public assistance of a medical kind and hospital treatment, whether provided under the Public Health Acts or the Poor Law. This comprehensive therapeutic service is to be administered by "ad-hoc local authorities comprising representatives of bodies or authorities through which contributions are received and of organised bodies of persons supplying services"; in other words an authority after the fashion of the present local insurance committees.

There can be little difference of opinion as to which of these schemes is more in line with the evolution of British local government, nor, indeed, as to which would be more acceptable to the medical profession. It is obvious, however, that continuance of the collection of insurance contributions, and of the administration of financial benefits through friendly societies and insurance companies, must be accompanied by a demand for a voice in the control of the management of any medical service which is part of an insurance scheme. In this connexion, the cost of extensions of the kind proposed was rather casually mentioned in the conference at little more than £11,000,000, the sum tentatively put forward by the Royal Commission on National Insurance in 1926. It seems to have been overlooked that that figure did *not* include the cost of any hospital service, and that no country has yet succeeded in bringing such a service within a self-contained and solvent general insurance scheme. Inclusion of hospital treatment would probably entail such large subventions from the present responsible authorities, the county and county borough councils, as to raise a demand from them for an overwhelming representation on any ad-hoc administrative bodies, which would leave them little different in constitution from committees of these councils.

The conference of Friendly Societies adopted its committee's scheme unanimously, and evidently contemplates early negotiation with the B.M.A. and bodies representative of county and municipal authorities and insurance committees. In the meantime, the need for extension of a general practitioner service to dependants is being rapidly, if partly, met by the development of public medical service schemes organised by practitioners themselves. Consultant services might also by this time have been widespread outside of London, where one such scheme is working, but for the fact that consultants have looked upon them with suspicion. It might be well for them to realise that while they are hesitating they may find themselves faced with proposals to which they have no ready alternative.

THE GALL-BLADDER AND CARDIAC PAIN

> "The heart and the gall-bladder are each capable of producing devastating and demoralising pain. Their innervation is from neighbouring regions of the central nervous system. It would be surprising if the symptoms were always so clear-cut that they could be given their true significance. Many practitioners have had cases which have perplexed them as to whether they were dealing with a cardiac or a gall-bladder disorder."

THIS quotation from a paper by Dr. CHARLES MILLER[1] sets out the main elements of an important problem which has been much discussed. Many cases have now been recorded in which attacks of pain might fairly have been described as cardiac or anginal in origin, but were permanently banished by removal of the gall-bladder. This has led some authorities to believe that disease in the gall-bladder may be the direct cause of disease in the heart. For example, in the correspondence which arose on Dr. MILLER's paper, Lord MOYNIHAN stated that where heart disease is given as the reason for not operating for gall-stones, a subsequent cholecystectomy is commonly followed by restitution of the heart to normal or by considerable relief of cardiac symptoms. Disease of the myocardium, he said, may often be regarded as the strongest indication for surgical measures. Again, it is not a rarity to find an attack of cardiac arrhythmia associated with what clinically seems to be an attack of cholecystitis, and in a later letter Dr. MALCOLM STALKER described a case in which biliary colic seemed directly responsible for a paroxysm of complete arrhythmia. JAMES MACKENZIE,[2] who was fully aware of these difficulties, maintained that the condition most often mistaken for angina was colic arising from the gall-ducts or the gall-bladder, and in illustration quoted JOHN HUNTER's illness, suggesting that the pain HUNTER had 17 years before his death was due to gall-stones and differed widely in character from what he suffered eleven years later. This view was supported when an examination of Hunter's body revealed both coronary artery disease and gall-stones.

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[1] A General Medical Service for the Nation. London: B.M.A. House. 1930. 6d.

[1] THE LANCET, 1932, i., 769.

[2] Angina Pectoris, London, 1923.

Many other authorities have expressed their belief that disease of the biliary tract is a common cause of cardiac disease—among them, in England, H. D. Rolleston and Osler. In the United States R. H. Babcock reports having seen many cases in which operation has proved that cardiac disorder was immediately secondary to a chronic or acute cholecystitis; and similar opinions are held by M. J. Lichty and Bayard Holmes. Recently A. P. and R. N. Klemmer[3] have studied a series of 69 cases showing various degrees of associated cardiac and biliary tract disease. In 21 of these the heart was so far damaged that operation was undesirable, but when the patients were treated by non-surgical biliary drainage—and rest—there was much improvement in the cardiac condition. E. Doumer[4] distinguishes two types of case: in the first there is indefinite but alarming malaise associated with paroxysmal arrhythmias set up by reflex irritation from the gall-bladder; in the second there are attacks identical with true angina. Referring to the first type he points out that though extrasystoles are of no cardiac significance they may be produced by reflex irritation from an inflamed gall-bladder and in more or less prolonged attacks may give the sensations of palpitations, accompanied not so much by pain as by a sensation of great anxiety —"a sensation of profound, indefinable, and menacing malaise"—with a fear of impending death and a feeling of oppression in the chest. This last symptom may well mislead the physician into a diagnosis of true angina but careful interrogation should prevent the error. The second type, in which cholecystitis gives rise to a syndrome identical with angina of cardio-arterial origin without any associated arrhythmia, is much more difficult. The existence of such cases can hardly be doubted, Prof. Doumer thinks, since many convincing observations are on record. During the attack, he adds, correct diagnosis is almost impossible, but the electrocardiogram—although not infallible, since altered complexes need not be present—will often reveal the truth when the results of clinical and X ray examination are indefinite.

We may end, as we began, with a quotation from Dr. Miller. "Is it possible," he asks, "for a diseased gall-bladder to produce symptoms that would be agreed to be cardiac? This question cannot be answered dogmatically, but it is possible that disease of the gall-bladder can produce the same shock and symptoms similar in type, localisation, and severity as disease of the heart. . . . Cases occur in which the symptoms are cardiac, and later a gall-bladder attack supervenes which calls for operation. After the operation the cardiac symptoms disappear. We cannot be certain, we can only speculate about such cases."

THE DROUGHT CONTINUES

The Easter vacation seems to have satisfied the Minister of Health of the urgency of the need to safeguard water-supplies, for his first act after the recess was to present a Bill to give local authorities power to act promptly. The Bill does not increase the grant of a million pounds provided by the Rural Water Supplies Act which received Royal assent on March 28th; but it makes it possible to apply this grant with more immediate effect. The situation is without parallel in our time, although most of the questions at issue arose in the great drought of 1921–22, when the use of waste water and of compensation water, the pooling of water interests, the question of central control, of rights to underground water, of standard rates of domestic consumption, of adequacy of future reserves and of utilisation of abandoned sources of water-supply were all actively canvassed. Many waterworks authorities were then forced to take cognisance of a wide variety of factors which previously had not invaded their horizon. More remarkable still, an atmosphere of trust was created between water authorities and consumers which had never existed before to the same extent. That drought left us a little better equipped for the future, but pity of it that the fear of scarcity was allayed too soon for much practical result.

The situation to-day is far more serious than it was 12 years ago, although it is hardly likely to hit the urban dweller further than to limit waste and luxury. A circular issued to owners and occupiers of premises within the area of the Metropolitan Water Board has asked them to be careful of leaking taps and unattended hose-pipes. "Use water but do not waste it" is the keynote of its message; but in rural England it will require a careful consideration of local needs and conditions if there is to be any water to use. In his circular of April 6th the Minister has asked every water authority for an outline scheme of development. In some cases it may be a stand-pipe supply that is most urgently needed; in others the provision of a good well or the development of a spring, or the means for collection and storing of rain-water. A piped supply may not be practicable because of its cost, and it might be worse than useless unless sewage disposal were provided at the same time. The grant will not be given unless consumers are willing to pay proper charges for their water, and it will come as a surprise to a community that has regarded water as a priceless gift from the skies to be told that the Minister considers 3*d.* a week not excessive for supplying a cottage rated at £5 a year. But the local authority will be given a wide range in its search for water, with the choice of contracting with an adjoining authority which has more than it needs; or with a landowner or water company able to provide; or through a new development of local sources by combining with neighbouring parishes or rural districts. The present situation offers ample scope for bold and wise local statesmanship.

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[3] Med. Record, Feb. 7th, 1934, p. 135.
[4] Echo méd. du Nord., Feb. 25th, p. 286.

ANNOTATIONS

CENTENARY OF THE ROYAL STATISTICAL SOCIETY

ON April 17th the Royal Statistical Society will celebrate its hundredth birthday. In the afternoon the Prince of Wales, hon. president of the Society, will preside over the Centenary meeting, and in the evening Lord Meston, president, will take the chair at a centenary banquet. The International Statistical Institute, which was founded at the time of the Society's jubilee, is holding its biennial session in London, so that the meetings will be attended by distinguished statisticians from all parts of the world. The founders of the *Statistical Society of London* (the style was changed to Royal Statistical Society after the jubilee) were men of insatiable curiosity; the first volume of the *Journal* (now in its ninety-seventh volume) provides information respecting the numbers of bibles in houses of working people, the number and proportion of perpetrators of burglaries escaping, the number of fourpenny pieces issued in 1836–38, the dislike of the French by the New Zealanders, experiments with manure in Northumberland, and much, very much, besides.

Primarily the founders were interested in social phenomena, and so it is not surprising that, from the first, medical topics occupied a good deal of attention. The first volume contains a detailed study of the sickness and mortality among the troops in the West Indies, by Colonel A. M. Tulloch, and in the fourth volume the name of the greatest of medical statisticians, William Farr, appears as the author of a paper on the mortality of lunatics. Medical men have in fact served the Society with a zeal out of proportion to their numerical strength. At the present time the number of medical fellows does not greatly exceed the number of peers of the realm on the Society's roll, but, in our own generation, Sir Shirley Murphy, Sir Arthur Newsholme, Dr. Reginald Dudfield, Dr. T. H. C. Stevenson, Prof. Major Greenwood, and Sir William Hamer have been very active members; the three survivors, Newsholme, Hamer, and Greenwood, are members of the council now in office. In earlier times the Society owed much to the labours of four medical men, each of whom became president. William Farr was president in 1871, William Augustus Guy in 1873, T. Graham Balfour in 1888, and Frederic J. Mouat in 1890. Of course, as a statistician, the name of Farr stands first—indeed, we need not restrict our list to medical presidents if we wish to put the name of Farr at its head—but in the grateful memory of the Society the name of William Augustus Guy (1810–85) has precedence of any other, lay or medical. Guy was an enthusiastic statistician, his first contribution to the *Journal*, "On the Value of the Numerical Method as applied to Science, but especially to Physiology and Medicine," appeared in the second volume, his last in the forty-fifth volume; he was hon. secretary from 1843 to 1868, and at his death bequeathed a large sum of money to the Society. In his honour, the medals presented by the Society to eminent statisticians are called Guy medals and bear excellent portraits of the Society's distinguished fellow and benefactor.

With the increasing emphasis put upon the preventive aspects of medical science—not to speak of an increasing resort to quantitative methods in the evaluation of clinical data—the importance to our profession of the science for which the Royal Statistical Society stands becomes greater. We hope that in the second century of the Society's existence the proportion of its medical fellows will increase and that their enthusiasm may match that of Farr and Guy.

MALARIA IN THE ARMY IN INDIA

THE introduction of a new method of treatment for any disease is an event; malaria is of such importance among human ills that the finding of a drug to supersede quinine would be little less than a revolution. Isolated therapeutic trials may or may not hold when tested out in the light of a wider experience; the public health commissioner with the Government of India has had to ask himself exactly how much the Army in India has profited from recent developments in malaria therapeutics. His answer is contained in the second volume of a report recently noticed in this column.[1] It would be too much to expect that malaria had surrendered pride of place as the chief scourge of the Army in India. It still accounts for 14·5 per cent. of admissions to hospital for all forms of injury and disease, and during 1932 totalled some 4634 cases; this does not include out-patient attendances, nor does it give any idea of the loss of general efficiency caused by malaria. But of a steady improvement during the last few years there can be no doubt, for the rates per 1000 sick with malaria have fallen from 291 in 1928 to 91 in 1932; and that in spite of the fact that climatic conditions in 1932 were favourable for an outbreak and that anti-malaria measures had been curtailed on grounds of economy. Presumably, then, some new factor has been introduced which has influenced the situation. Partly by a process of exclusion, partly from accumulating clinical evidence, the conviction is growing that a more extensive and intelligent use of Plasmoquine is mainly responsible for the good record of 1932. That this year, like its three antecedent years, was liable to a high malaria incidence, is made likely by the number of sufferers among the Indian troops—a proportion considerably in excess of former years—who were not treated with plasmoquine, and who do not contract malaria in cantonments but in their native villages. Although the amount allotted to sanitary and engineering field works was only 10*d*. per head of the [illegible] (as compared with £1 15*s*. 4*d*. for similar measures in the Panama zone), yet there has been a steady improvement in the quality of the anti-malaria measures, owing to the influence of Lieut.-Colonel J. A. Sinton, V.C., who directs the malaria survey of India. Anti-malaria officers who have been through the course at the experimental station at Karnal are filled with an enthusiasm which rises superior to the many practical difficulties with which they are faced.

On the prophylactic value of quinine the consensus of Army opinion is favourable on the whole, mainly because it diminishes the symptoms and reduces the liability to pernicious attacks of subtertian fever. The prophylactic value of plasmoquine was tried out on a large scale in Burma between September, 1931, and February, 1932. Well over 5000 officers and men took part in this experiment. The dose given was 0·02 g., above which toxic effects are occasionally observed, and it is probable that 0·03 g., in combination with quinine or atebrin, would be more effective. It is clear however that the smaller dose has a definitely delaying action without interfering in any way with the subject's physical activities and general well-being. On the whole the results of the Burma experiment were good, plasmoquine undoubtedly materially reducing the relapse rate. It was generally given in combination with quinine; atebrin was introduced too late in the season for any conclusions to be reached about its comparative value.

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[1] THE LANCET, March 17th, p. 581.

LANARKSHIRE MILK EXPERIMENT CONFIRMED

It will be remembered that during a period of four months in 1930 an investigation on an unprecedented scale was carried out in Lanarkshire to determine the effect of adding extra milk to the diet of school-children. Grade A tuberculin-tested milk was supplied raw to 5000 children of 5 to 12 years of age, while another 5000 children received the same milk after it had been submitted to low-temperature pasteurisation. Ten thousand children served as controls. At the beginning and end of the investigation the children were measured to the nearest eighth of an inch in height and to the nearest ounce in weight. The results, which were recorded[1] by Leighton and McKinlay, showed that the addition of milk to the diet led to an increase in the rate of growth as reflected both by height and weight, and that in so far as the conditions of the investigation permitted there was no apparent difference in their effect on growth between raw and pasteurised milk. This second conclusion was challenged by Bartlett, and by Fisher and Bartlett, who, on analysing the figures in a different way, satisfied themselves that the growth-response of children on raw was greater than that of children on pasteurised milk. The whole plan of the investigation was criticised[2] by "Student" on the grounds that raw and pasteurised milk were never given in the same schools; that the initial heights and weights of the children in the control series were greater than those of the children who were given milk; and that since the children were weighed in their clothes, and since the first weighing was in February and the second in June, there may have been a differential shedding of clothes by the more prosperous control and the less prosperous milk-fed children. "Student" suggested that in a new investigation on the comparative value of raw and pasteurised milk probably more information at much less cost would be obtained by working with identical twins.

Though this principle was not strictly applicable to the Lanarkshire experiment, it occurred to Prof. Karl Pearson that a great deal of information might be obtained if the children in each class—controls, raw milk feeders, pasteurised milk feeders—having approximately the same height and weight could be compared. This suggestion was followed up, and Miss Ethel M. Elderton, D.Sc., working in Prof. Pearson's laboratory, has recently recorded[3] the results of such an analysis. The original cards were obtained and sorted for each sex into the year of birth. Selection was then made of a child from the control series who was of the same initial height, the same weight within 8 oz., and the same age within a month, as one who had been given milk. The following comparisons were then made: controls with raw milk feeders; controls with pasteurised milk feeders; and raw with pasteurised milk feeders. By this method only the average children could be compared; the shortest and tallest, and the lightest and heaviest had to be excluded. It was found (1) that those who have extra milk generally gain in height over those who do not, and that the older girls gain more than the younger when pasteurised milk is taken, but that otherwise younger and older gain equally in height by having extra milk; (2) that those who have extra milk generally gain in weight over those who do not; that girls gain more than boys, and the older girls than the younger; and that this difference associated with age is greater when raw than when pasteurised milk is taken; (3) that there is no evidence that raw milk has an advantage over pasteurised or pasteurised over raw in increasing growth when the two are directly compared on this selected material; and that the question of the value of pasteurisation turns practically on the elimination of possible sources of disease, or on determining whether cases of certain diseases are less frequent when pasteurised rather than when raw milk is taken.

These conclusions are largely in agreement with those originally drawn by Leighton and McKinlay, and lend no support to the view that low-temperature pasteurisation produces a significant change in the composition and food value of milk.

LABORATORY DIAGNOSIS OF CHOLECYSTITIS

Two recent papers show how much can be done to clear up the diagnosis of acute and chronic cholecystitis respectively by laboratory tests. In the first,[1] Dr. Nils Liedberg, of Lund, Sweden, gives an account of 145 clinically certain cases of cholecystitis the majority of which had been followed systematically with sedimentation tests. His material also includes 31 cases of uncomplicated gall-stones, the diagnosis of which was in every case verified by operation and the microscopic examination of the gall-bladder. He found that during the first 24 hours of an acute cholecystitis there is, as a rule, no increased rate of sedimentation of the erythrocytes. During the second day 90 per cent. of the cases show an increased rate, the average one-hour rate being 29 mm. During the third, fourth, and fifth days this rate rises continuously, the average for these three days being 48, 57, and 61 mm. respectively. The sedimentation-rate appears to behave as if it were quite independent of any jaundice that may be present. In the majority of cases of uncomplicated gall-stones the sedimentation-rate is normal; in the rare cases in which it is increased the departure from normal is only slight. Dr. Liedberg concludes that the sedimentation test is, perhaps, better than any other in reflecting the pathological changes; it may throw light on the clinical progress of acute cholecystitis, provided it is carried out systematically. In chronic cholecystitis Dr. Etienne Chabrol and Dr. André Busson[2] have found the quantitative analysis of biliary pigments in the blood useful in diagnosis and as a guide to treatment. They publish a table which includes 45 patients who had been kept under observation for several weeks after a bout of pain without showing the least tinge of jaundice of the conjunctiva. Nevertheless, according to this table, 39 of these patients had a degree of bilirubinæmia well above the 2·0 mg. limit. These authors regard the normal limits of bilirubin in the blood-serum as 0·8–1·6 mg. per 100 c.cm. of serum, although it might be imprudent to diagnose hypercholæmia for any reading below 2·0 mg. The amount of cholesterin in the blood is less significant. After an examination of more than 200 patients, the authors found that the concentration of cholesterin in the blood-serum exceeded 180 mg. per 100 c.cm. only in every fourth case. They regard hypercholesterinæmia more as a sign of atheroma or chronic nephritis than of biliary lithiasis.

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[1] See THE LANCET, 1931, i., 145.
[2] Biometrika, 1931, xxiii., 398.
[3] Ann. Eugenics, 1933, v., 326.

[1] Acta Chir. Scand., 1934, vol. lxxiv., Fasc. I.–III.
[2] Presse Médicale, Feb. 10th, 1934.

SYDNEY HOWARD VINES

THE number of medical men must be large who owe their first serious grounding in botany to Prof. Vines, the emeritus professor of botany at Oxford, who died on Wednesday, April 4th, at the ripe age of 84. His first Alma Mater was Cambridge, where, as a scholar and later a Fellow of Christ's College, he was associated from 1875 for the next 13 years with the remarkable group of men who were at that period making history in the science school. Although never becoming a qualified medical man, Vines began his career as a medical student, and was three years in the medical school of Guy's Hospital before gaining a scholarship which took him to Cambridge. There he did not continue his medical studies, but decided to specialise in botany. With that object he proceeded to work at Wurzburg under Prof. Sachs, whose text-book on botany he translated. He was then appointed university reader in the subject, while Charles Babington, "Beetles" Babington the great field-naturalist, still held the chair of botany. Vines expounded in his college and university lectures a new school of thought in regard to botany, developed on the association of the science with the manifold progress then being made in physiology and physiological anatomy. In 1886 these lectures were published and shortly afterwards the Students Text-book of Botany appeared, and immediately won for its author his prominent and popular place as a teacher. Vines was elected professor of botany at Oxford in 1888, and under him the department grew rapidly in size and importance, and when he retired from the chair in 1919 his honorary degrees, a distinguished series of them, reflected justly the wide esteem in which he was held by the educational world. The lives of Babington and Vines cover over a century of British botany, for Babington also lived till he was well over 80 years of age.

TONSILLECTOMY AND THE SCHICK REACTION

DESPITE the accumulation of material no final opinion can yet be formed about the correlation of tonsillectomy with diphtheria immunity. Contradictory results have been presented by reliable workers, some finding that children whose tonsils have been removed tend to be Schick-negative while others have noted no significant difference between children with and without tonsils. In seeking to analyse this discrepancy later observers have been careful to indicate the social conditions of the children they have examined. Schick and Topper worked in New York City and made their observations in children of a poor social grade; they found what they considered a significantly higher Schick-negative rate among tonsillectomised than among non-tonsillectomised children. Doull and Herman investigated medical students at Johns Hopkins University; Wheeler and his colleagues, ordinary school-children in Baltimore; Shaw, school-children in Chicago; and Burton and Balmain, school-children at Ilford; and none of these found a significant difference in the Schick-negative rate in the two groups of children. Dudley, in a careful study made at the Greenwich Hospital School, is indeed the only other investigator who brings support to Schick and Topper's original contention, but as Dudley has abundantly shown, the Greenwich school was something of an epidemiological museum so far as diphtheria was concerned. Certainly deductions from observations made there under the old régime must be generalised with caution. In the inquiry reported on p. 790 Dr. Buice's material consisted of children from a rural area in America and he again finds with the majority that tonsillectomy and Schick-immunity are not correlated. If positive deductions must be made, it is probably easier to make them from the study of rural populations, where the uncertain effects of waves of epidemic infection can be eliminated. At the same time it does not appear impossible that children belonging to heavily infected groups may as a result of tonsillectomy allow an entry of diphtheria bacilli and a latent immunisation effect as shown by the Schick test. It is at any rate noteworthy that both Schick and Topper's and Dudley's observations were made among children who must be looked upon as belonging to a heavily infected herd.

THE STUDY OF INEBRIETY

ON Tuesday Sir Humphry Rolleston, as president of the Society for the Study and Cure of Inebriety whose jubilee arrives this year, deeply interested his audience with the history of the society and of its founder, Norman Kerr. Kerr, who was born exactly one hundred years ago, started as a journalist and then entered Glasgow University where a society existed, supported by the students and their teachers alike, for the promotion of total abstinence. Kerr graduated as a doctor in 1861, and lived a life for the next ten or twelve years which familiarised him in a practical manner with the tragic concomitants and sequences of drunkenness. He was resident surgeon at a Lock hospital, he was medical officer to a line of steamers plying between Scotland and America—his experiences in Glasgow thus being reinforced by what he saw on the other side of the Atlantic—and he became surgeon-superintendent of the Glasgow Emigration Department of the Board of Trade. Then he came to London, and for the next quarter of a century conducted a large general practice in the neighbourhood of Regent's Park where his work as a parish medical officer brought him into close association with the life of slumdom, and where, going from door to door, he saw evidence of the evils to combat which he was resolving to devote his life. In association with the Church of England Temperance Society he assisted in the activities that led to the passage of the Habitual Drunkards Act, and after the passage of this Act he became honorary secretary to the Homes for Inebriates Association. This association founded the Dalrymple Home at Rickmansworth, and a large section of the work carried on here has been closely analysed in the *British Journal of Inebriety* by Dr. F. S. D. Hogg, for many years the licensee. In 1884 the Society for the Study and Cure of Inebriety came into being, and its activities under such fine presidents as Wynn Westcott, Mary Scharlieb, Claye Shaw, Alfred Pearce Gould, not to mention those who are still with us, have been steadily progressive. The society during its fifty years of endeavour has considered every aspect of the use of alcohol as an individual and a social disease, and many of the contributions to its journal will be remembered by our readers as having led often to discussion. The society has supplied evidence through which both the medical profession and the public at large can follow the reasoning, when the principle is maintained that drunkenness is not an excuse for crime, or when debate centres round the question whether alcoholism is itself a crime, irrespective of the criminal or anti-social behaviour to which its abuse conduces. Again where legal issues are raised in deciding whether, intention being the element of an offence, the delinquent had been mentally capable of forming an intention at all, the medical evidence may be both critical and difficult to follow. The activities of the Society for the Study and Cure of Inebriety are directed to the elucidation of these and allied difficult problems, and it can look back, at its jubilee, upon a valuable record.

Sir Humphry's address was delivered at the rooms of the Medical Society of London, and was preceded by a luncheon at the Langham Hotel.

UNIVERSITIES YEAR BOOK

THE Year Book of the Universities of the Empire for 1934[1] differs but little from its predecessors, and this is well for the time and thought that have been put into its production since the first issue in 1914 have resulted in a volume which could hardly be bettered for accuracy and ease of reference. The best evidence of its appreciation is the increasing care and promptitude, noted by the editor, with which the returns are made by the registrars or other officials of the institutions included in the book. Practically the only change is in the order of the overseas universities which have been altered to conform with the arrangement of the home universities. Additional information has increased the volume by about 30 pages but without increase in bulk. In the name of medical faculties we offer thanks to the Bureau and to Sir Frank Heath in particular.

RESEARCH IN MENTAL DISORDERS

FOR many years past the annual report of the Board of Control has been issued in two parts, the second of which is occupied with a record of the scientific research work done during the year in the institutions visited by the commissioners. Last year 51 of the 99 county and borough mental hospitals sent in reports, and we took occasion[2] to summarise the attempts being made to solve the problem of dysentery and typhoid in mental institutions. In the aggregate this work must account for a very large outlay in time, thought, and money, and it is of the first importance that research should be directed into profitable channels. More recently we indicated in a leading article[3] some of the basic difficulties in the way of eliciting the causes of mental illnesses from clinical data. The Medical Research Council has had an investigation committee dealing with mental disorders, but a reference to the successive annual reports of the Council shows clearly enough that the mental side of medicine has not had a very large share of the Council's attention. This is not to overlook that the expenses of important researches at the Cardiff City Mental Hospital have been defrayed by grants and that assistance has been given for work at the Maudsley Hospital and for an important inquiry into the ætiology of mental deficiency at Colchester. There will therefore be cause for rejoicing that the mental disorders committee of the Council has been reconstituted to include representatives not only of psychiatry, medical psychology, and the study of mental deficiency, but also of neurology, physiology, biochemistry, pathology, and genetics. The appointment of the new committee has been made by the Council in consultation with the Board of Control to assist them in the promotion of research. The chairman of the reconstituted committee will be Prof. E. D. Adrian, M.D., F.R.S., a member of the Council, and the following will also serve: Sir Hubert Bond, a senior commissioner of the Board of Control; Dr. Bernard Hart, University College Hospital, London; Prof. D. K. Henderson, M.D., Royal Edinburgh Hospital for Mental and Nervous Disorders; Dr. T. A. Ross, Cassel Hospital, Penshurst; Dr. E. O. Lewis, a commissioner of the Board of Control; Dr. C. P. Symonds, Guy's Hospital; Mr. J. H. Quastel, D.Sc., Cardiff City Mental Hospital; Dr. J. G. Greenfield, National Hospital for Nervous Diseases; Dr. F. L. Golla, Maudsley Hospital; and Dr. L. S. Penrose, Royal Eastern Counties Institution, Colchester. Sir David Munro, of the Council's staff, will act as secretary.

PROLONGED ARTIFICIAL RESPIRATION

ON another page Dr. Tookey Kerridge describes how a patient with respiratory paralysis attributed to progressive muscular atrophy has been kept alive by artificial respiration for over two years. The story is instructive in the first place because it shows a gradual replacement of manual methods by mechanical substitutes which have proved at least as effective. Secondly, it emphasises the necessity for such mechanical help, since not even the extraordinary devotion of this patient's friends and attendants could have kept him alive without it. And thirdly, we are left with an account of a simple and convenient machine—somewhat resembling Rudolf Eisenmenger's "biomotor"[1]—which ought to find many applications in practice. Nowadays, attempts to pump and suck air directly into and out of the lungs have been abandoned, and mechanical methods of artificial respiration follow Schafer's manual method in exerting and relaxing pressure on the abdomen and lower ribs. Schafer's method, contrary to general belief, is effective chiefly through compression of the abdomen, not the ribs; it makes use of the piston action of the diaphragm to empty and fill the lungs. In his "rocking method," F. C. Eve applies the same principle: he puts his patient on a trestle or stretcher which is seesawed about its mid-point, and the weight of the abdominal viscera raises and lowers the diaphragm and so aerates the alveoli.[2] Eve's apparatus is very simple, can readily be improvised, and appears to have no theoretical drawback except the possibility that stomach contents will be regurgitated and inhaled by the patient. The "rocking" principle can be applied, moreover, to the revival of new-born infants with asphyxia, and N. C. Forsyth[3] has found this effective and convenient. Other things being equal however (which they seldom are), the best means of applying artificial respiration for asphyxia neonatorum,[4] and, indeed most other conditions, is provided by the Drinker-Shaw respirator. This large metal suit, in which the patient's body is exposed to alternating pressures, has often been described in our columns from the time when Prof. Drinker demonstrated it at the London School of Hygiene and contributed to THE LANCET an account of it with illustrations.[5] It remains to be stated, however, that the apparatus he left behind was bought by Messrs. Siebe Gorman and has been used, with some successes, at various hospitals in London and elsewhere, the expenses of its transfer being borne by the firm in question. It is surprising that until a week or two ago no institution in this country possessed a respirator of its own, and we have to congratulate the Hospital for Sick Children, Great Ormond-street, on having now obtained, through representatives of Imperial Chemical Industries, a new machine made by Messrs. Siebe Gorman and modified in accordance with the suggestions of Dr. F. J. Poynton. The fact that there are more than 20 such machines in New York City alone suggests that use will be found for the Great Ormond-street installation, and this will give those in charge of it an opportunity of studying the management of the patients, which is not in practice as simple as might be supposed. In poliomyelitis, in particular, respiratory paralysis does not always respond to artificial respiration in the way that is hoped, and the experience reported by N. L. Crone [6] of 24 cases treated at the Massachusetts General Hospital is not altogether encouraging.

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[1] Edited by Sir H. Frank Heath, G.B.E., K.C.B., for the Universities Bureau of the British Empire. London: G. Bell and Sons. Pp. 1010. 15s.

[2] THE LANCET, 1933, ii., 1169.

[3] Ibid., March 30th, p. 690.

[1] See THE LANCET, 1932, ii., 1067.

[2] Ibid., 1932, ii., 995; 1933, ii., 740.

[3] Brit. Med. Jour., April 7th, 1934, p. 619.

[4] See THE LANCET, 1932, ii., 953.

[5] Ibid., 1931, i., 1150, 1186; 1933, ii., 602.

THE PRESIDENCY OF THE ROYAL COLLEGE OF PHYSICIANS OF IRELAND

NOT for over 150 years has a President of the Royal College of Physicians of Ireland died while in office. The unexpected death, therefore, of Dr. F. C. Purser, a few weeks ago, gave rise to some conjecture as to the procedure that should be adopted by the College. It was commonly assumed that the vice-president would carry on the presidential duties until a new President would be elected, and that such election need not take place before next St. Luke's Day. A study of the legal position, however, showed that with the decease of the President the vice-president's powers disappear, since he only holds office during the pleasure of the President, and only acts as his deputy. The College found itself, therefore, upon Dr. Purser's decease, without any executive or titular head, and had to proceed forthwith to the election of a President. In the special circumstances it was found most convenient to invite a distinguished ex-President, Regius Professor T. G. Moorhead, who had completed his term of office last October, to resume the presidential duties. Accordingly, Dr. Moorhead has been elected President.

THE ROYAL MEDICAL BENEVOLENT FUND

THE annual general meeting of the R.M.B.F. was held on March 22nd in Chandos-street, Cavendish-square, the offices of the Medical Society of London, when satisfactory reports were placed before the audience by Mr. R. M. Handfield-Jones, the hon. secretary, and Dr. Lewis Glover, the hon. treasurer. It is satisfactory that the number of subscribers has been substantially increased; the total income during the year 1933 amounted to nearly £12,000, but unfortunately, however, the applications for help which had to be immediately met called for the expenditure of a little more than £12,000, the result in figures being a gap of £1435. This will have to be filled in the immediate future if the activities of the corporation are to proceed without reduction, and this we cannot contemplate as possible. Rather, urged by the increasing support of the Fund, which has taken place slowly during the past few years, we prefer to think that additional subscribers will be found among our readers and their clients. At the meeting some true incidents were narrated showing both the urgent need in which applicants to the Fund for help often are, and the painful circumstances which have led to their situations. Similar stories have often found their way into our columns, and we are certain have influenced those who read them to help the work of the Fund. They display the reasons for the Fund in the briefest and most striking manner. When we learn of the daughter of a medical man serving as a postman in a wild Scottish district, who does not apply for assistance until she is paralysed; and of another daughter of a medical man, a music teacher, whose plight when she asks for assistance is such that she has had to sell her violin to obtain food—when we hear such testimonies alike to the misery with which the Fund attempts to deal and to the courage of those whom it helps, we feel that the efforts of the promoters are indeed worth while.

At the conclusion of the meeting the honorary officers of the society, Sir Thomas Barlow as president, Dr. Glover as hon. treasurer, and Mr. Handfield-Jones as hon. secretary, were re-elected. Mr. E. C. Pennefather, the secretary, will receive contributions from a list of supporters which calls pathetically for expansion at 11, Chandos-street, Cavendish-square, London, W.1.

A DONATION of £15,000 from Mr. Robert McDougall and one of £5000 from the Halley Stewart Trust has ensured continuance of the experimental fields at the Rothamsted Agricultural Station. It is unthinkable that the remaining £8000 required should not be raised by May 12th in behalf of activities that may be described without exaggeration as having made scientific agriculture in this country.

OUR news columns contain the announcement that the Garton prize and gold medal for an essay on the biological effects and mode of action of radiations upon malignant and other cells has been conferred upon Dr. Hector Colwell, who has long been associated with such work at the Middlesex and King's College Hospitals. The prize is of the value of £500, and is awarded by the British Empire Cancer Campaign. A second award has been made to Dr. F. G. Spear, of the Strangeways Research Laboratory, Cambridge, and his collaborators.

FOURTH INTERNATIONAL CONGRESS OF RHEUMATISM. This congress has already been announced in our columns; it is to be held in Moscow from May 3rd to May 6th, and representatives from many European countries and from America will be present. The programme is as yet provisional, but on May 4th the subjects to be discussed, coming under the head of pathology, will be the general pathology and pathogenesis of rheumatic fever; the incidence of nutrition as a factor in treatment; and the clinical aspects of rheumatism in children. On May 5th the discussion will largely turn on the balneological treatment of rheumatic patients, when the mud *régime* in affections of the locomotive apparatus, and the indications for the use of sulphur saline waters and radio-active baths will be discussed. Further subjects announced for papers or debate are the use of spa methods outside the spa, and the results to be obtained from a combination of balneological and physio-therapeutic treatment. The representatives at the congress from Great Britain are Prof. A. P. Cawadias and Dr. Bernard Schlesinger, with Dr. W. S. C. Copeman as official representative of the Royal College of Physicians of London.

The Society for Cultural Relations has in hand arrangements for a group of doctors to visit Moscow on the occasion, and the details can be obtained at the office of the society, 1, Montague-street, London, W.1. Visitors can travel overland via Berlin and Warsaw or by boat to Leningrad. During the visit opportunities will be found for members of this group to visit medical and social institutions in which they are interested, and to meet Russian physicians engaged in similar work.

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[6] New Eng. Jour. Med., March 22nd, 1934, p. 621.

PROGNOSIS

A Series of Signed Articles contributed by invitation

II. PROGNOSIS OF DIABETES IN CHILDREN

MANY doctors still consider that the diagnosis of diabetes mellitus in childhood involves not only a serious but also a gloomy outlook for the child's future. Serious it certainly is, but no gloomy prognosis is justified in this insulin era. This optimistic view demands support, especially for those not fully familiar with what insulin therapy can do. Dr. Priscilla White has recently published a book on "Diabetes in Childhood" based on a study of the large number of children treated in Dr. E. P. Joslin's clinic in Boston. In her introductory sentence she says:

> "Before the discovery of insulin the mortality of diabetes in childhood was nearly 100 per cent., and to-day diabetes as a cause of death in the young has disappeared nearly to the vanishing point."

She supplies figures to show that early death can be replaced by continued health, and a similar experience is confirmed from all diabetic centres. Dr. White devotes a chapter to diabetic children surviving diabetes for ten or more years, of which she had 72 living in 1931. Of these 15 were in college, 26 were employed, and 4 were married. She points out that five years previously it was possible to find records of only 13 cases in the entire world who had diabetes in childhood and had survived ten years. The figures of my own cases (under 16) are worth recording as they show a difference between hospital patients and those under better social conditions.

	Numbers.	Deaths.	Per cent. living.
Hospital patients	59	6	90
"Private" patients	69	1	99

These figures have no statistical value since they do not take into account the survival time in each individual case. Some of these children have survived ten years, others have only been a year or so under treatment. I think, however, that they are of some value as an indication of the difference between private and hospital patients.

To ensure such good results continuous care and treatment are certainly necessary and in practically every case insulin injections. There is no question of invalidism or prolonged hospitalisation for these children, but a routine of controlled diet and insulin is essential and the prognosis depends almost entirely on its efficiency. Let us see what this involves.

At first, on diagnosis, most diabetic children are seriously ill and suffering from a heavy ketosis. Starvation will often precipitate coma and insulin is usually needed at once. The child should be placed on an adequate diet, liberal in carbohydrate and total calories and the correct amount of insulin carefully worked out to metabolise it. Two, very rarely three, injections a day are necessary. This initial treatment can, in my opinion, be carried out with full efficiency only in institutions where special facilities and experienced skill are available. Most practitioners rightly enough hesitate to undertake this part of the treatment.

It is essential also that careful arrangements be made for carrying on this treatment at home. The parents, or a special nurse or nannie, must be taught full details about dieting and how to suit the child's tastes by providing variety. Someone in the house must also be skilled in insulin injections and preferably also in watching progress by urine tests for sugar and perhaps acetone bodies. A daily routine is necessary which no practitioner can supervise in full and constant detail, but he should be familiar with the case and ready to advise when the routine is upset. Most children over 10, and some still younger, soon become capable of managing their diet and injections without any worry. Indeed I find that whatever strain may result seems to fall not on the affected child but on the anxious parents. The child's life and habits are practically normal and it soon accepts everything as normal routine. Clear instructions must also be given as to variations in treatment during illness and infections, when the failure to modify treatment may allow severe ketosis and even coma to develop in a few days.

When the above conditions are observed the *physical* outlook is entirely hopeful and normal. Certainly no one could pick out these diabetic from normal children in a bus, a school, or a hospital department. Growth and development proceed normally and average weight is maintained. Puberty ensues at the usual age, except in some cases treated on undernutrition diets with insufficient insulin. A few of these remain stunted in spite of a later change to a higher level of nutrition. The poorly treated may have several physical abnormalities. When the carbohydrate has been too low and the calories have been mainly provided by fat, continuous ketosis and a large fatty liver may be found. In still more uncontrolled cases with continuous hyperglycæmia, opacities may develop in the lens and operation for cataract may become necessary. Some workers declare that most of these children develop arteriosclerosis, minor but appreciable by refined methods of examination, but I have not noticed this in many cases. I believe all complications to be animadversions on the treatment employed and preventable with successful therapy. Many diabetic children have been kept in normal health with insulin for ten years and a few have already become parents.

The mental and social position and outlook of these children are surprisingly normal. Under 6 years they may be resentful and distressed by the injections for a few weeks, but rarely longer if properly handled. When diets large enough to satisfy hunger and to include variety are provided, as they should be, there is little difficulty with children breaking diets. As the diet provides ample supplies of fresh foods, vegetables, and vitamins, bowel function and dental development are usually above the average.

A *cure* of diabetes in children, or indeed at any age, is not within the present powers of medical science. Indeed practically all need insulin injections to ensure health and normal development. All oral substitutes for insulin are useless for children, although nothing is more desired by those interested in their welfare. The dose of insulin required varies from a few units to even a hundred in exceptionally severe cases. It is common to find small doses sufficient at the beginning of treatment and larger, even very large doses, necessary later, especially above 11 and 12 years of age. The years approaching puberty often seem to demand a greatly increased dosage, especially in girls. In all cases doses adequate to control the sugar ensure normal health, although the control of the diabetic condition may be more difficult in severe cases requiring large doses.

The outlook and prognosis therefore depend not on scientific therapeutic difficulties but on the practical subjected himself to severe and useless suffering; he asserted that the specialists had diagnosed his case wrongly, the operation had been unnecessary, and he was entitled to compensation of over £1000. The evidence showed that both professors had been treating the man free of charge, and that the patient's wife had made no attempt to obtain any information about her husband's condition before the operation. The defendants stated that they acted correctly and humanely in not disclosing to the patient that he was suffering from cancer, although the diagnosis was clear to them. It was only in the course of an exploratory operation that it was ascertained that the disease had gone too far to respond to operative treatment, and there was no other means of establishing the size of the growth. They had not communicated with the patient's wife, as she had never before asked for information, and they were not aware that the patient had a regular medical attendant. The plaintiff's legal adviser pointed out that the patient has a right to know what his condition is, and must give his consent to any major operation; but the defendants disagreed. Prof. Finsterer explained that as long as the public was convinced that cancer is incurable—though this is actually no longer true—he would never tell a patient flatly that he had cancer. Innumerable suicides would be the consequence of such a practice, and the shock of such a diagnosis has in several cases turned an operable patient into an inoperable mental wreck. Prof. Zweig also stated that under similar circumstances he would not tell a patient the truth bluntly. The opinion of medical experts was unanimously in favour of this attitude. The hearing was adjourned to obtain further evidence, but a discussion in medical circles showed that an overwhelming majority of medical men upheld the course taken by the two professors, though admitting that there are individual patients to whom the truth can safely be told.

NEW REGULATIONS CONCERNING NOTIFIABLE DISEASES

The Epidemics Act of 1913, which deals with the duties of the medical profession in cases of infectious diseases, has lately been brought up to date. There are two groups of notifiable diseases in Austria. The first group comprises scarlet fever, diphtheria, typhoid and paratyphoid fever, dysentery, cerebro-spinal fever, puerperal sepsis, typhus, small-pox, cholera, plague, recurrent fever, leprosy, trachoma, yellow fever, glanders, anthrax, rabies, chicken-pox, poliomyelitis, epidemic post-vaccinal and post-infectious encephalitis, and malaria. Every case or suspected case of these diseases, and every death due to them or suspected of being due to them, must be reported to the local health authorities. The only exception is puerperal sepsis; suspected cases of this disease need not be reported. The second group contains diseases which are to be notified only under certain conditions. They are measles, whooping-cough, and mumps in places such as spas, health resorts, and watering places, and in schools and institutions where there are children under 15 years; rubeola in such schools and institutions; influenza in Vienna; active tuberculosis of the lungs and larynx in hospitals or tenements, or where infection is likely; other forms of tuberculosis when the patients live in tenements where there are children under 12 years; and venereal diseases (gonorrhœa, ulcus molle, syphilis) if transmission is feared. Doctors are also bound to report venereal cases if the patients evade treatment, but the greatest care must be taken to ensure strict secrecy. In all cases of compulsory notification (Group I.) a final report must be sent to the same health authority when the infection is at an end; this is also required in cases of measles, rubeola, whooping-cough, and mumps, which have been notified. A medical man who fails to comply with these regulations is liable to a fine not exceeding 2000 Austrian shillings (£65) for the first group, 500 shillings for the second group, and 40 shillings for cases of tuberculosis. If a correct diagnosis cannot be arrived at without laboratory tests the physician may avail himself, free of charge, of the services of a laboratory attached to a municipal or local hospital. The new regulations also deal with the problem of infectious cases which are nursed at home.

THE DEVELOPMENT OF THE BRAIN

At a recent meeting of the Biological Society Prof. Versluys, the zoologist and biologist, read a paper on the volume and capacity of the brain. According to the researches of Dr. Dubois, the teaching of Darwin that the brain has enlarged in correspondence with increased demands upon it is erroneous. On the contrary research has shown that the volume of the brain has developed by leaps and bounds, and that this development is due to intrinsic factors whose ultimate cause is the reduplication of the nerve-cells. The increase in size produces an increase in efficiency and enables the individual to lead a more complicated life. But it is the increase in the size of the brain which comes first. In applying these principles to human development, Dubois draws the following conclusions. The brain of man in remote times was bigger than his needs demanded, and he only gradually learned to make proper use of its possible efficiency and qualities. The Neanderthal man had a brain equal in size and number of nerve-cells to the brain of a man of to-day. To-day any Negro child from Central Africa is able to carry out complicated studies at a university which his parents, endowed with the same brain, entirely ignored. Dubois considers that the explanation of how man has gained faculties and qualities which have no direct practical value in the struggle for life—for instance, higher mathematics or philosophy—is that he always had brain cells which were capable of such development. This theory raises the question whether modern man has not already attained the peak of efficiency which the size and volume of his brain make possible.

PAYING PATIENTS AT THE MIDDLESEX HOSPITAL

No one who contemplates the uninspired façade of the new Woolavington wing of the Middlesex Hospital could guess with what cunning its interior has been modernised. The conversion of a block which used to provide accommodation for nurses and residents to a wing for paying patients has been made possible by the generosity of Lord Woolavington, who provided the cost of a complete reconstruction, little more than the outer shell remaining. The approach is through the courtyard of the hospital (Fig. 1) or through a separate entrance in Cleveland-street, and since the wing remains an integral part of the hospital building the patient can be taken to any department for special investigation or treatment—for example, to be X rayed—without having to go out of doors. In the main, however, his needs are met within the wing. Two operating theatres and anæsthetic rooms are provided, and smooth working lifts and rubber-covered corridors minimise

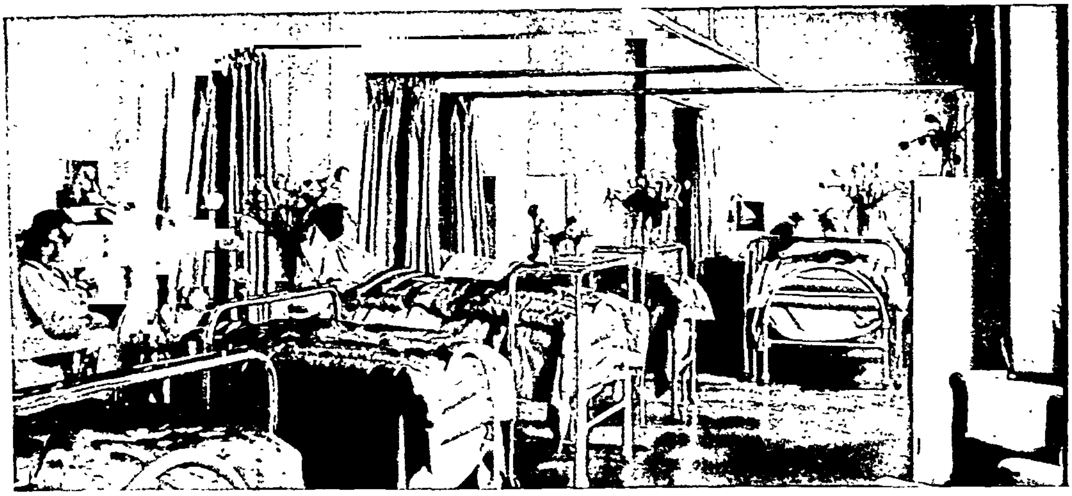

FIG. 2.—A ward with curtained cubicles.

the vibration and noise too often associated with movements of patients in hospitals. The rooms themselves, whether containing one bed or six, are furnished attractively with the comfort of a bedroom at home rather than the austerity of a hospital ward. Each bed has a silk eiderdown with curtains to match, and so arranged that the patient has some free space all round his bed and can see out of a window without being overlooked by his neighbours. He has also (Fig. 2) a really serviceable bedtable, with metal legs, and a black glazed top on which there is room for his own flowers and books as well as for a food tray, and a switchboard with plugs for bell, reading lamp, telephone, and wireless, as well as for any electrical apparatus which may be necessary for diagnosis or treatment. He is not worried by the sound of other people's bells, because no ring is audible; the bell actuates a red light outside the room which can only be extinguished by a switch at the patient's bedside. Radiators and electric heaters are provided, but each room has a grate for an open fire if this is preferred by the patient.

FIG. 1.—Garden front of the Woolavington wing.

The dietary is in charge of a trained food supervisor, and the patient has a choice of menus for each meal. Precautions are taken to ensure that meals are served hot, and that any special diets ordered are presented in varied and palatable forms. A sister-superintendent is in charge of the nursing services, and a high proportion of fully trained nurses is employed. Patients may be visited by their friends, subject to medical approval, on any day between 11 A.M. and 12 noon, and between 3 P.M. and 6 P.M.; a waiting room for guests is provided.

Altogether 64 beds are available in the wing, divided as follows: 12 beds in curtain cubicle wards at four guineas a week; 28 single rooms at seven guineas and 16 at twelve guineas; and 7 to 9 cots for children at charges ranging from four to ten guineas a week. Accommodation for mother or nurse can be provided where desired. Services charged as extras are special nursing and massage and electrical treatment. Only patients who are paying reduced fees to the physician or surgeon in charge are admitted to rooms at seven guineas a week or under, and the total professional fees paid by these patients will not exceed fifty guineas. Every patient admitted is under the care of a member of the honorary medical staff of the hospital, but practitioners are given every facility for visiting patients and may collaborate in their treatment by invitation. Altogether the arrangements here made for the convenience of paying patients seem to be in every way admirable.

THE HAMMERSMITH HOSPITAL.—In reply to inquiries we are happy to state that the plans of the new British Postgraduate Medical School, reproduced in our article last week, were drawn up in the architect's department of the London County Council. The architect to the L.C.C. is Mr. G. Topham Forrest, F.R.I.B.A.

GENERAL MEDICAL COUNCIL

ELECTION OF A DIRECT REPRESENTATIVE

NEXT Tuesday, April 17th, voting papers will be sent out for the election of a direct representative for England and Wales on the General Medical Council, to fill the place of Dr. Christine Murrell, who died before taking her seat. Two candidates have been nominated—viz., Dr. H. G. Dain and Dr. E. A. Gregg.

Direct representation of the registered medical practitioners in the United Kingdom dates from the Medical Act of 1886, which allotted three to England and Wales and one each to Scotland and Ireland. Sir Norman Walker has now represented the practitioners of Scotland since 1907 and Dr. Leonard Kidd the practitioners of Ireland since 1906. The number of direct representatives for England and Wales was increased to four and quite recently to five, the senior representative being Sir Henry Brackenbury who has held office since 1925. Dr. E. K. Le Fleming and Dr. J. W. Bone were first elected in 1928 and Mr. Bishop Harman in 1929. The term of office is five years, but a direct representative is capable of re-election. It is some time since there has been an election, for Dr. Bone and Dr. Le Fleming were re-elected last year without contest. The most recent contest was in November, 1929, when Dr. Arthur Haydon contested without success the re-election of Sir Henry Brackenbury and Mr. Bishop Harman. In the previous November Dr. Gordon Ward and Dr. Gregg contested the re-election of Dr. Le Fleming and Dr. Bone unsuccessfully at the end of their first period of office. It was remarkable that on this occasion more than half the possible voters took no part in the election, although Dr. Ward and Dr. Gregg asked for a mandate from the general body of practitioners to overhaul the existing constitution of the Council in the light of defects which they considered had emerged during its 70 years' existence.

We print below the election addresses of the two candidates for the medical suffrage. Dr. Dain, who is chairman of the Insurance Acts Committee, has not stood before. It may be recalled that he has already been selected by a plebiscite of B.M.A. members from a list which included the names of Lady Barrett, Mr. R. G. Hogarth, F.R.C.S., Dr. J. S. Manson, Dr. L. A. Parry, Dr. Ernest Ward, Dr. A. Clarke Begg, Dr. S. Morton Mackenzie, and Dr. H. Vicars. Dr. Gregg is the candidate of the Medical Practitioners' Union and, as noted, has already stood for representation.

Dr. Dain's Election Address

To registered medical practitioners in England and Wales

At the request of many of my friends I am offering myself as a candidate for election to the General Medical Council to fill the vacancy recently announced.

It is recognised on all sides that the directly elected representatives of the profession occupy a position of peculiar responsibility, since the General Medical Council is so largely made up of those appointed by the Royal Colleges, Universities, and other licensing bodies—that is, of those whose experience is in consultative work and in teaching and examining medical students. For this reason it is most important that the directly elected representatives, forming but a small proportion of the whole Council, should have first-hand knowledge of the medical problems which arise in general medical practice: in other words, that they should be able to represent the interests and the point of view of the great body of their fellow practitioners who, having been taught medicine, have never gone on to become teachers.

In seeking your support and vote in this election, I do so as one who is in active general practice, and has been for more than 36 years. The work of the practice includes all types of patients—private, national health insurance, and public medical service—and has made me familiar with the medical and economic problems commonly encountered by the family doctor.

During the last 20 years in a variety of medico-political work and offices I have had exceptional opportunities for meeting practitioners from many parts of the country and becoming acquainted with their views, and at the present time I can claim to be in very close touch with their outlook and experiences.

On the subject of medical education I hold the opinion that the curriculum with its necessary tests and qualifying examinations should always have in view the production of the well-educated general practitioner, and that detailed teaching in special subjects should be a matter for the post-graduate period. In the consideration of any future proposals to modify the existing scope of the curriculum I shall always have in mind the attainment of this object.

The educational, administrative, and legislative aspects of medical practice are to-day of such a character as to have heightened the importance and influence of the General Medical Council. It is therefore all the more desirable that the views of the private general practitioner should be amply represented and considered in the deliberations of that body.

Should you do me the honour to elect me it will become my privilege to assist in the work of the Council, to increase the efficiency, to maintain the dignity, and to improve the ethical standards of the profession to which we all belong.

Bournebrook House, Selly Oak, Birmingham.

Dr. Gregg's Election Address

General Medical Council Election

I have been asked by many of my professional colleagues to stand as a candidate in the forthcoming election to fill the vacancy on the General Medical Council, vice Dr. Christine Murrell, deceased.

I have decided to allow my name to go forward and solicit your support on the following grounds:—

(1) I have been engaged in general medical practice for almost 25 years, including panel practice since its introduction, and am intimately acquainted with the problems of those engaged in such practice.

(2) I have been associated with medical organisation during the whole of my professional life and have represented my colleagues for many years on the London Panel Committee, London Insurance Committee, Insurance Acts Committee and the London Public Medical Service. I have also been engaged in public work during most of this time. I have served as Councillor, Alderman and Mayor of the Metropolitan Borough of St. Pancras and have been chairman of almost every committee of the Council, including the public health committee, maternity and child welfare committee, etc. I have also been chairman of the St. Pancras Board of Guardians, prior to its being taken over by the London County Council, having, in the course of years, been chairman of the Hospitals Committee and other committees of that Board.

(3) I have always advocated increased direct representation of general practitioners on the General Medical Council and, if elected, I will take every opportunity to press this reform.

(4) I am satisfied that the present system of medical education requires considerable modification in order to enable medical practitioners now entering the profession to deal adequately with modern conditions of practice.

(5) I am also of opinion that some alterations are necessary in disciplinary procedure.

In connexion with any proposals for alteration in any of the above directions, I shall advocate that the view of the profession be taken.

I have had sufficiently long experience of service in a representative capacity to know that it is impossible to forecast in detail the line of action which circumstances may indicate should be taken. I can only assure those of my colleagues who do me the honour of recording their vote in my favour, that, as in the past, so in the future, my efforts will be directed in such ways as are most likely to be to their advantage as well as to that of the community in general.

Harrington-square, London, N.W.1.

PANEL AND CONTRACT PRACTICE

Temporary Residents

LAST year's panel conference referred the question of the treatment of temporary residents to the Insurance Acts Committee, which appointed a subcommittee to go into it. As a result Memo. M26 has been issued to panel committees in the hope of leading to some definite decision at the panel conference in the autumn. The matter is important financially to insurance practitioners, for while no one wishes that doctors who do attend insured persons when away from home should not be adequately paid, there are many instances on record of claims being made for treatment as a temporary resident when actually no treatment was given. The memorandum points out that the system of payment divides itself into two sections :—

(a) The crediting by the Minister on the advice of the Medical Distribution Committee of the practitioners' fund in each insurance area in proportion to the area's liability to be visited by temporary residents, and similarily debiting the fund of each area on account of the temporary residents leaving their home area.

(b) The method of payment for attendance upon temporary residents adopted locally.

Payment is made by the insurance committee from the local practitioners' fund of the area to which the temporary resident has come. This fund is determined each year after taking all relevant circumstances into consideration. The allocation to and the charges against it are based upon data, furnished by insurance committees, which show the number of medical cards accepted by practitioners as temporary residents and the number of attendances recorded on the medical records (continuation cards) returned to each committee. There are two categories of temporary resident : (1) the insured person who goes away to stay with friends or at an hotel, (2) the inmate of a convalescent home ; and the return gives the numbers in each category.

On these facts the distribution committee advises the Minister as to how much each local practitioners' fund shall be credited or debited. At the present time the value of an ordinary temporary resident is 8*s*., and that of a convalescent home temporary resident is 1*s*. When the amount of each local practitioners' fund has thus been determined centrally, its distribution amongst the local doctors is governed by the local distribution scheme for that area. These schemes vary in different localities. Three pay on an attendance basis; others pay in units, the unit being the amount received for an ordinary resident insured person each quarter (approximately 2*s*.). The number of units allowed for an ordinary temporary resident varies in different areas from ten to two, the average being five for England (10*s*.) and six for Wales (12*s*.); but since the local fund receives only 8*s*. for each ordinary temporary resident it follows that the loss from this fund by paying out (say) 10*s*. to the doctor attending a temporary resident case is borne by all the other doctors in that local area. Only 22 areas take care not to pay out more money for temporary residents than they receive from the central fund.

For convalescent home cases the local fund receives 1*s*. a case, and again taking the unit as equal to 2*s*. the number of units credited locally in respect of these patients, varying from 7 to ¼, gives a maximum payment of 14*s*. and a minimum of 6*d*., with an average of 4*s*. in England, 6*s*. in Wales, 4*s*. in Scotland. There is therefore an average local loss, borne by the practitioners of the area, of 3*s*. in England, 5*s*. in Wales, and 3*s*. in Scotland for every temporary resident of this class.

Such being the facts it may be asked why it is that local practitioners are willing to bear such losses. Possibly the explanation is that those areas in which convalescent homes abound receive so much more panel money per head than other areas without such homes that this loss has not been noticed. Some figures for the year 1933 will illustrate this point. They give the number of temporary residents (of both sorts) per 10,000 of the committee's panel, deducted or added, in various areas and the payment per capita on each doctor's list for this area:—

	Deduction.	Capitation fee.
London	52	8·2*s*.
Birmingham	32	8·5*s*.
Newcastle	29	8·6*s*.
Hull	18	8·3*s*.
Liverpool	19	8·5*s*.
East Ham	22	8·6*s*.
	Addition.	
Southport	237	8·4*s*.
Blackpool	498	9·2*s*.
Hastings	272	8·11*s*.
Cornwall	101	8·8*s*.
Isle of Wight	183	8·8*s*.

The normal capitation fee corresponding to these figures is 8·12*s*.

To take Blackpool as an example, as they receive payment for 498 temporary residents for every 10,000 insured persons on their list the doctors there receive 9·2*s*. for every person on their panel instead of 8·12*s*., the official rate (with 10 per cent. deduction). They do not complain about their local distribution scheme.

The convalescent home cases give rise to much dissatisfaction, for at present the 1*s*. per case is paid for all residents in convalescent homes whether they require treatment or not. The medical cards are collected from patients on arrival, signed by the medical officer, and forwarded to become credits to the local fund. Some homes have rules about routine examination upon arrival solely for the benefit of the home. If treatment and/or advice is not given on that occasion there would not appear to be any sound reason for payment to the doctor from health insurance funds. Medical officers are often in receipt of an honorarium for undertaking this work ; in such cases they are being paid twice for work (if any) done.

The Insurance Acts Committee suggests that panel committees should approach their insurance committees with a view to altering the local distribution scheme so as to provide that temporary resident credits will only be allowed in those cases in which a medical record (continuation card) is submitted containing evidence that medical treatment has been given. An examination of a routine nature for the purposes of the convalescent home or similar institution shall not count as treatment. With this the London panel committee has agreed.

Own Arrangements

When the National Health Insurance system was started it was thought—and quite rightly—that, as there would be many insured people attached to medical attendants unwilling to take service under the Act, some provision should be made for the continuance of such attendance. An "own arrangement" clause was therefore introduced under which insurance committees are empowered to allow insured persons to make their own arrangements for receiving medical attendance and treatment (including medicines and appliances), and, subject to regulations, to contribute towards the cost a total sum not larger than the committee would otherwise have expended in providing medical benefit for them. It should be noticed that discretion is given to insurance committees under this clause. In the early days of the national scheme doctors hostile to it advised all their patients who were entitled to medical benefit to apply for permission to make their own arrangements—with the result that insurance committees began to refuse, as many do now, even to consider such applications.

The figures for 1933 show that 50 insurance committees did not give any permission at all. On the other hand, Ipswich apparently gives permission at a higher rate than any other committee in England—viz., 118 for each 10,000 insured persons on its list. Other rates are: York 109, Oxford 83, Croydon 78, Birmingham 17, London 7, the average rate for England being 9·8. Some applications carry their justification on their face, such as that of a homœopathic patient whose nearest insurance homœopathic doctor lives a long way off but whose own homœopathic doctor is quite close. Nurses and other hospital employees are often allowed to make own arrangement with some member of the staff of the hospital by individual application. It is thought that as the unreasoning hostility to the Act has almost gone more sympathetic consideration might now be given to applicants who have some real cause for wishing to have their old family attendant look after them. But there is another form of own arrangement which is giving rise to trouble and was the subject of debate both at the last panel conference and at a recent meeting of the London panel committee. This is a collective application by the insured members of the staff of a hospital, asylum, or other similar institution to be allowed to make their own arrangements on an undertaking, to be signed by the chairman or other officer of the governing body of the institution, to provide medical attendance and treatment for the insured members of the staff who make such application.

What may happen is that an insured member of the staff is obliged to attend the doctor appointed by the institution—although he is supposed to have free choice—the obligation being made a condition of employment. This may work satisfactorily when the insured person lives in the hospital, but when he lives outside and falls ill the institution doctor cannot attend him at home and he naturally does not want to pay the outside doctor who does attend him, for he is entitled as an insured person to free medical attendance from the institution doctor, whom he has had to choose as a condition of employment but whose services he cannot get because he is living outside. For this "inside only" attendance the institution receives the whole capitation fee. There is no further medical benefit available to pay an outside doctor either for temporary resident treatment or emergency. The patient would therefore have to pay privately, although of course the private account might be sent for payment to the institution which has received the whole capitation fee.

If such a collective own arranger moves away (other than temporarily) outside the area of the insurance committee which gave permission, then the arrangement lapses and he becomes an ordinary insured person. The panel committee for London agreed, after much discussion, with the view expressed by the Insurance Acts Committee, that it is most undesirable for non-resident members of the staff of an institution to be required to make their own arrangements with the institution; the ordinary medical benefit arrangements are better for them. In the London area there are only three institutions (all hospitals) where the whole staff make their own arrangement for the receipt of medical benefit (including drugs), but it is not thought that these hospitals put any pressure on employees living outside to come into the scheme. There have been no complaints in London on the subject, although nurses taken ill at home or away on holiday do have to pay privately for their attendance—if nurses ever pay doctors at all—and get the money back from the hospital later if they can.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

Surg. Comdr. (retd.) R. F. Quinton to be Surg. Capt. (retd.).

W. B. Taylor to be Surg. Lt.

Actg. Surg. Lts. (D) to be Surg. Lts. (D): D. D. Craig, W. L. Mountain, and S. R. Wallis.

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Comdr. G. H. S. Milln is placed on the retd. list with the rank of Surg. Capt.

ROYAL ARMY MEDICAL CORPS

Lt. I. H. C. Morton to be Capt.

ARMY RESERVE OF OFFICERS

Lt.-Col. T. H. Gibbon, having attained the age limit of liability to recall, ceases to belong to the Res. of Off.

MILITIA

Maj. W. M. Biden retires on attaining the age limit and retains the rank of Maj.

TERRITORIAL ARMY

Maj. R. I. Dacre to be Lt.-Col.

Lt. C. N. Suter to be Capt.

Capt. H. V. Forster, having attained the age limit, retires and retains his rank, with permission to wear the prescribed uniform.

INDIAN MEDICAL SERVICE

Majs. N. D. Puri and J. B. Vaidya to be Lt.-Cols.

Lt. R. J. Jarvie to be Capt. (provl.).

Lt.-Col. C. R. O'Brien retires.

ROYAL AIR FORCE

Flight Lt. H. R. Clein is transferred to the Reserve, Class D (ii).

HONORARY PHYSICIAN TO THE KING

The King has approved the appointment of Bt. Col. J. W. L. Scott R.A.M.C., as K.H.P., in succession to Lt.-Gen. Sir Harold B. Fawcus (retd.).

LONDON OPHTHALMIC HOSPITALS.—At the annual meeting of the Royal London Ophthalmic Hospital, City-road (Moorfields Eye Hospital), it was stated that the very extensive scheme of reconstruction now in progress is estimated to cost £96,103. An anonymous donor has given £6000, and has offered a further £4500 provided that the new building can be opened free of cost, which involves the raising of a further £14,000 by the end of the year.—Thanks to legacies the Central London Ophthalmic Hospital closed last year with a surplus of £1463. The success of the new squint department has been so great that overcrowding has resulted, and it will be necessary to provide increased accommodation. Good use has been made of the Princess Marie Louise wing for private patients, and there has been an increase in the number of persons attending the ophthalmic clinics.

OBITUARY

STANLEY MELVILLE, M.D. Brux., M.R.C.P. Lond.

RADIOLOGIST TO ST. GEORGE'S HOSPITAL

WE much regret to learn the death on April 6th of Dr. Stanley Melville. He had not been in good health for some time and had suffered from anginous attacks, while injuries received and bravely endured in the course of his professional work had subjected him to much pain.

Stanley Melville, born in 1868, was a Liverpool man and was educated in his native city and at University College, London. He took the English double diploma in 1893, and returning to Liverpool held many appointments in connexion with the Royal Infirmary, being assistant in the ophthalmological and throat departments, house physician and resident medical officer in the lock wards. He held appointments also at the Liverpool Northern Hospital, and was for a time demonstrator of anatomy in University College, Liverpool. He came to London in the early 'nineties, took the M.D. Brux. degree, and practised in the neighbourhood of Earl's Court, while he also studied for the Bar and was admitted at Lincoln's Inn.

In 1898 he began to take a deep interest in the new science of radiology, and made such a good name for himself in the practice of his specialty that he was appointed radiologist in succession to the West London Hospital, to St. George's Hospital, and to the Brompton Hospital for Diseases of the Chest. He worked assiduously, with personal reason to know the risks incurred in those early days of radiological practice, for he incurred serious burns of the hands, while his writings on his subject, the result of personal knowledge, soon attracted attention. He was the author of the Diagnosis of Intrathoracic New Growths from the Radiological Standpoint, and contributed to this journal and other medical periodicals articles upon radiography, especially in relation to diseases of the chest. He now threw himself actively into the movement in this country for the better protection of X ray workers, and in 1921 became joint secretary of the British X Ray and Radium Protection Committee—the first of its kind in any country. In 1928 the British "recommendations on protection" were adopted internationally at the Second International Congress of Radiology at Stockholm, and Melville was appointed with Mr. G. W. C. Kaye, D.Sc., superintendent of the physics department of the National Physical Laboratory, joint secretary of the International Protection Committee.

DR. MELVILLE

[Photograph by Russell

Melville never spared himself in national and international movements for advancing radiological activities. He was, in his time, president of the Electrotherapeutics Section of the Royal Society of Medicine, president of the Radiological Section of the British Medical Association, secretary of the British Institute of Radiology, and secretary-general of the First International Congress of Radiology held in London in 1925. His was, indeed, the guiding hand for many years in the educational activities of the British Institute of Radiology, particularly in relation to the diploma in medical radiology and electrology of the University of Cambridge. He acted as examiner in radiology at both Cambridge and Liverpool Universities. He was one of the founders of the Society of Radiographers and its first president. A few days before his death he had accepted nomination as hon. medical editor of the *British Journal of Radiology* by the council of the institute. He was appointed chairman of the British delegation to the forthcoming Fourth International Congress of Radiology at Zurich next July, and had been singled out by the executive as the British authority to contribute to a discussion on the radiodiagnosis of pulmonary tuberculosis.

Calls upon Melville's services were numerous, for, in addition to his positions at St. George's and the Brompton Hospital, he was at different times consulting radiologist to the Midhurst Sanatorium, the Ventnor Hospital for Consumption, the Royal National Orthopædic Hospital, and the Grosvenor Hospital for Women, appointments from which he derived his extensive knowledge of the value of X rays in the diagnosis of lung diseases. This was the subject on which his final public address was made as president last year of the British Institute of Radiology, incorporated with the Röntgen Society. This address he concluded with the admission that he had at first regarded the X ray diagnosis of pulmonary disease with considerable doubt, but had grown with his experience to be thoroughly optimistic as to its future utility. He was also consulting expert to the Ministry of Health, in which capacity he rendered ungrudging assistance both to the central bureau and to local authorities.

Melville's great characteristic was service—service to his patients, his science, the State, and his friends. For all these he spent freely his powers, and was rewarded by the high regard of his fellow-men. He was a man of great personal charm, natural dignity, and unfailing courtesy. He held strong convictions and never hesitated to challenge a situation or policy which in his judgment was unsound or untenable, and would not serve the best interests of radiology. He maintained an enviable cheerfulness despite his damaged hands which frequently caused him much pain. His loss will be acutely felt by his many friends. The closing months of his life were clouded by the death of his wife, his beloved companion of many years. He died from heart trouble after a week's illness in a nursing-home in Wimpole-street, and deep sympathy will go out to his family now doubly bereaved.

Sir Humphry Rolleston, who in more than one direction of important work was Melville's colleague, writes: "British radiology has suffered a severe blow in the sudden death of Stanley Melville who, though long an ailing man, always presented a cheerful uncomplaining front to painful disabilities, evil strokes of fortune, and the prolonged illness of his charming wife, the companion of his advance from general practitioner in Nevern-square to the position he attained in the radiological world. Few of the pioneers of radiology in this country have done so much to secure its development on proper lines, to establish the status, provide adequate education, promote scientific work, and set up a qualification in the form of a diploma for radiologists. While doing much for skilled technical assistants or radiographers he was active in bringing about a satisfactory understanding of the relative provinces of medically qualified and of other radiological workers. The establishment of a diploma in medical radiology and electrology (D.M.R.E.) at Cambridge in 1919, and the necessary teaching and examinations, were his constant care. After the death in 1921 of his friend and colleague, Dr. W. Ironside Bruce, from aplastic anæmia, Melville's energy and whole-hearted devotion brought into being the X Ray and Radium Protection Committee, the first in the world, which though too late to save him from serious damage has been a service of incalculable value to present and future generations of radiologists. This alone marks him out as one who should not lightly be forgotten. Quietly and effectively he had long worked for the establishment of the British Institute of Radiology, incorporated with the Röntgen Society, and it is a satisfaction that he lived to be its president. Melville devoted the best energies of his life to promote the development of radiology without ever putting himself forward, hinting or asking for reward, but those who really knew the man recognise that the radiological world has lost a great soul."

CHARLES PORTER, M.D. R.U.I.

LATE MEDICAL OFFICER OF HEALTH FOR JOHANNESBURG

Dr. Charles Porter, who was for 23 years health officer for Johannesburg and had seen it develop from a mining camp to a university town of more than 200,000 inhabitants, died on March 7th at Muizenberg, Capetown, where he had gone on holiday. Born in Cork in 1864, he was educated there and later in Dublin, and at University College, London. In 1880 he won an entrance scholarship in the civil engineering school of the Queen's College, Cork, but soon transferred to the medical faculty with the intention of graduating for the Army or Indian Medical Service. In 1889 he graduated in medicine, with honours and exhibition, at the Royal University of Ireland. His eyesight proving a bar to military service he continued his studies, holding resident appointments at maternity and fever hospitals in Cork, and taking a certificate in mental diseases and the diploma in public health at Cambridge University. In 1890 he was appointed assistant medical officer of health for East Kent, and from 1893–98 he was M.O.H. for Stockport. The six annual reports issued to his council during that time are a record of his grasp of the social aspects of hygiene at a time when official public health was concerned rather with drains and nuisances. Under his stimulus the corporation of Stockport was one of the first, if not the first, to grapple practically with the question of maternal education. In 1900 Stockport teachers met the sanitary committee and agreed to arrange for the instruction of the elder schoolgirls in the feeding and management of infants, using as a guide the booklet drawn up by Dr. Porter and supplied by the sanitary committee. A health visitor was appointed to visit each school occasionally to supplement by demonstration and otherwise the instruction given by the regular teachers. This work was developed further by Dr. Porter's successor, Dr. Meredith Young, when he was transferred to Shropshire as its county medical officer. Called to the Bar at Gray's Inn in 1898, he was frequently employed as witness in local government and parliamentary inquiries relating to water-supply and sewerage purification schemes. In 1901 he became a vice-president of the Society of Medical Officers of Health, and in the following year he left for South Africa.

His earliest work of importance for Johannesburg was to draft a petition on behalf of the town council for the extension of the boundaries of the town, and he received special commendation for his execution of this task. The following year saw him advocating the establishment of a university in the town. For the rest he was fully occupied with the organisation of an efficient public health department in a rapidly growing community, the huge insanitary area of Burghersdorp providing a problem none too easy of solution. In turn he put through schemes for the purification of the city's water-supply, for disease prevention, child welfare, control of milk-supply, and disposal of refuse and sewage. He was consulting adviser to the Rand Water Board from its inception, a member of the Public Health Council of the Union, specialist adviser in military hygiene to the Union Defence Force, and a member of numerous Government Commissions relating to education, hospitals, mining regulations, prisons, and housing.

THE LATE MR. DAVID LEES

We have received further tributes to the strong character and wide knowledge of the late David Lees. Especially the work which he did in combating the effects of venereal disease have brought out testimonies to his energy and far-sightedness. At his funeral in Edinburgh a large attendance was representative of the medical profession and of the public movements in whose activities he had shared.

MR. LEES

[Photograph by Bacon

HERBERT ERNEST CUMMING, M.D., C.M. McGill, M.C.

We regret to record the death of Dr. H. E. Cumming, which occurred on March 17th at his house in Hereford. Born in 1888 at Ottawa, Cumming received his medical education at McGill University, where he graduated as M.D., C.M. in 1913. He was prominent in university circles, both as an able student and a fine athlete, and at the outbreak of war had just completed holding the house appointments at the Montreal General Hospital. For fine service in France during the war he received the M.C., and at the conclusion of hostilities came to London as house surgeon to St. Peter's Hospital for genito-urinary diseases. In 1919 he took the English double diploma and shortly afterwards went into general practice at Hereford, where his death will be much regretted.

ARCHIBALD BYRON MACALLUM, F.R.S.

EMERITUS PROFESSOR OF BIOCHEMISTRY, MCGILL UNIVERSITY

WE regret to learn the death on April 5th, in London, Ontario, of the distinguished physiologist Prof. Macallum.

Archibald Byron Macallum was born in 1858 in the Canadian city where he died. He was educated at Toronto University, had a successful career as a student, and was appointed immediately on graduation to the teaching staff. He was for three years lecturer on physiology in the medical school, and in 1891 became professor of physiology in the University. Seven years later he was appointed the first professor of biochemistry, a chair which he held till 1918, completing an association with the Toronto medical school which had lasted for nearly thirty years. In 1920 he was appointed professor of biochemistry in the University of McGill, a position which he held until 1929, being appointed emeritus professor on his retirement. During the interval between the two professorships, which occurred at the close of the war, he was active in the institution of the Canadian Industrial Research Council and became chairman of the organising body at Ottawa; his energy and resourcefulness made a success of the movement, and his retirement from that position was attributed to political reasons. He then transferred his services to the sister university in Montreal.

Prof. Macallum's literary activity was considerable, and he had much to write about that was founded upon his own personal researches. Such papers as those read before the Royal Society on the distribution of potassium in animal and vegetable cells, and on the nature of the silver reaction in animal and vegetable tissues, read before the Society in 1905, showed his extreme ability in conducting difficult and elaborate investigations as well as the power of stating conclusions clearly. He was elected F.R.S. in 1906, and from that time forward his contributions to British and Canadian and American scientific literature stamped him as a leading thinker and actor.

Macallum married Minnie Isabel, daughter of the late John Strachan Bruce, of Cornwall, Ontario, by whom he had three sons.

CORRESPONDENCE

DETERRENT MATERNITY FEES

To the Editor of THE LANCET

SIR,—At a time when maternal mortality is discussed so freely in both medical and lay papers, and when it is acknowledged that antenatal care and management is in great part the means for the prevention of this lamentable mortality, it seems strange to me that the Lindsey county council should pursue a course which has the effect of acting as a deterrent to patients and their doctors from applying for treatment.

A patient of mine, a primipara, in the ninth month of her pregnancy, was desperately ill with pyelitis. I applied to the county M.O.H. to have her removed to a hospital. She was taken there at once and treated most successfully and returned home in 18 days very pleased with herself and her baby. A few weeks afterwards she came to me in great distress with a bill she had received from the county council. The items on the bill were:

	£	*s.*	*d.*
Maintenance	8	13	8
Operation	3	3	0
Ambulance	3	6	0
	15	2	8

The husband is a wage-earner who receives £2 10*s.* per week, and they still owe for their furniture. He had filled in a form giving his means and liabilities, and received a request from the M.O.H. for the payment of the sum mentioned, being the cost to the council of his wife's treatment, by instalments if he preferred. It seems to me a case of giving with one hand and taking away with the other, and if poor patients know that bills of this size are to be sent to them it will be very difficult for doctors to persuade them to take advantage of the service provided by the county council.

If a woman has any symptoms of fever after a confinement she is cared for free of charge, and I am very strongly of the opinion that antenatal consultant and hospital treatment should also be free of charge.

I am, Sir, yours faithfully,

Scunthorpe, Lincs, April 4th. W. S. HALL.

MASTOPATHIA

To the Editor of THE LANCET

SIR,—In your leading article (p. 744) on Mastopathic and Chronic Mastitis occurs the following statement:—

> "Lenthal Cheatle and Cutler separate two distinct proliferative conditions, 'mazoplasia,' described as an exaggeration of physiological activity with epithelial desquamation, spontaneous disappearance at the menopause and no tendency to neoplasia. . . ."

Exactly what we say is that the only neoplasia we can definitely associate with the process is the formation of fibro-adenomata belonging to the type encountered at puberty and in the early years of life.

It is perfectly true to say that, during many years of examination conducted upon whole microscopical sections from normal and abnormal breasts, we have no morphological evidence whatever that the desquamative epithelial activity of mazoplasia changes into epithelial neoplasia. It is on this evidence that we do not consider the condition to be a precancerous one, nor one on which papillomata, nor any other kind of epithelial neoplasia, are superimposed.

I am, Sir, yours faithfully,

Harley-street, W., April 6th. G. LENTHAL CHEATLE.

To the Editor of THE LANCET

SIR,—May I call attention to words bearing on this subject in a book I published in 1911 entitled the "Disorders of Post-natal Growth and Development." Evidence was there given for the view that many chronic diseases which favour the declining periods of life bearing the termination "itis" and ranked as inflammation are in reality exaggerated forms of senile degeneration. The idea then so commonly held that degeneration is solely passive and atrophic is, of course, not in accordance with the facts, and if anyone is still of this opinion the histological studies of the tissues of aged dogs subsequently published by Goodpasture and Wislocki,[1] and by L. W. Smith,[2] and afterwards confirmed by an examination of the chief organs of 100 aged men and women by myself,[3] ought to convince them that senile degeneration is often expressed by a reversion to simplicity and proliferation.

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[1] Jour. Med. Res., 1915, xxxiii., 455, and 1918, viii., 127.

[2] Ibid., 1919, xl., 51.

[3] Tumors and Cancers, 1915, p. 259.

I therefore suggested the words "*presenile*," "senilate," "degenerative hyperplasia" as far more suitable for chronic fibrous or cellular or cystic enlargements of the breast (among other organs) than any of the words which imply inflammation. The excess of fibrous tissue, or of an embryonic type of cell, can hardly justify the use of the word inflammation in the absence of evidence of microbial invasion and of redness, heat, and discharge, three of its cardinal signs. On the other hand, the cells are of the low or debased type, such as might be expected to appear in an organ towards the end of its cycle of development while undergoing the dedifferentiation of degeneration. The evidence strongly favours the view that in the enlarged and cellular and cystic breast of the regressive phase of breast development we have not an inflammatory or constructive process but a degeneration—an amplified degeneration—in which under suitable stimulation or activation some of its cells might pass on into neoplasia and cancer.

I am, Sir, yours faithfully,

Reading, April 9th. HASTINGS GILFORD.

LYMPHADENOMA

To the Editor of THE LANCET

SIR,—On p. 736 of THE LANCET of April 7th, in a report of the recent discussion on lymphadenoma at the Royal Society of Medicine on March 27th, there is a misunderstanding that I should be much obliged if you would kindly give me the opportunity of correcting. I am there credited with saying that no evidence of specific allergy had been obtained, but that is, in fact, the very opposite to what I believe to be the case. In view of the absence of evidence as to the presence of larger micro-organisms, information was sought concerning allergy to a possible virus infection in lymphadenoma, and some cutaneous tests were carried out by Dr. James Maxwell with a boiled extract of dried lymphadenoma gland which Dr. Wilson Smith kindly prepared for us by the same procedure that he has already shown to be efficacious in detecting allergy to a known virus infection—namely, vaccinia. The results were described by Dr. Gow. Control cases and lymphadenoma patients in the acute stage of the disease were all negative, but in three instances of known lymphadenoma where the disease appeared to be in a resting stage positive cutaneous reactions were seen, and the largest one, reaching 3 cm. in diameter, was in a young woman back at work and in full vigour, who for the time being appeared to have completely recovered from the disease. Although we are still at an early stage, these cutaneous observations, coupled with the allergic reactions described by Dr. Gow with vaccines prepared from high dilutions of the patient's own gland suspensions are, I submit, definitely in favour of the view that a pathogenic agent of the virus class is operating in lymphadenoma.

I am, Sir, yours faithfully,

M. H. GORDON.

St. Bartholomew's Hospital, E.C., April 7th.

To the Editor of THE LANCET

SIR,—In the account of the discussion on lymphadenoma in your last issue (p. 737) I am reported as saying that the myeloses were malignant proliferation of the "leucopoietic system of the body." This should read "leucopoietic system of the bone-marrow"—or else "granulocytopoietic system of the body." Doubtless I was myself to blame for the mistake, but I should be glad to have it corrected.

I am, Sir, yours faithfully,

London, W., April 8th. F. PARKES WEBER.

MEDICINE AND THE RIGHT OF SANCTUARY

To the Editor of THE LANCET

SIR,—With reference to the correspondence on the evolution of professional secrecy in time of war, it is interesting to note that after the battle of Lützen a large number of soldiers were found to be wounded in the fingers. It was reported to Napoleon that these were voluntary (self) mutilations made to escape service. Napoleon ordered that two of those so wounded in each army corps should be shot. Larrey, the great military surgeon, resisted this edict. He constituted a medical jury which examined under his presidency 2632 wounded. He demonstrated that the wounds received in this way in all those examined by the jury indicated the bravery of those who had received them. Napoleon was at first greatly angered at the report, but after reflection he thanked Larrey and afterwards rewarded him handsomely. Larrey addressed a circular to the army surgeons: "You ought always," he wrote, "to heal and succour the guilty as well as the innocent, and you ought only to see the injured parts; the rest does not concern you." In 1871 in Paris "Versaillais" and "Communards" were admitted to the hospitals. The surgeons did their best for both factions: the rest did not concern them—it was not their affair.

I am, Sir, yours faithfully,

Gloucester-gate, N.W., April 8th. RUSSELL STEELE.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED MARCH 31ST, 1934

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 3 (last week 5); scarlet fever, 2812; diphtheria, 1091; enteric fever, 21; acute pneumonia (primary or influenzal), 1383; puerperal fever, 48; puerperal pyrexia, 121; cerebro-spinal fever, 31; acute poliomyelitis, 4; encephalitis lethargica, 6; relapsing fever, 1 (Hendon); dysentery, 12; ophthalmia neonatorum, 78. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on April 9th–10th was as follows: Small-pox, 11 under treatment, 1 under observation (*last week* 17 *and* 2 respectively); scarlet fever, 1663; diphtheria, 1777; enteric fever, 7; measles, 3670 (last week 35[illegible] 308; puerperal fever, 30 mothers (plus 1 [illegible] yelitis, 5; " [illegible] there were 20 babies (plus 12 mothers) [illegible] rum.

Deaths.—In 118 great towns, including London, there was no death from small-pox, 2 (0) from enteric fever, 153 (57) from measles, 14 (4) from scarlet fever, 51 (8) from whooping-cough, 47 (7) from diphtheria, 45 (19) from diarrhœa and enteritis under two years, and 94 (28) from influenza. The figures in parentheses are those for London itself.

The weekly total of fatal cases of influenza is again a little lower, the figures for the last few weeks (working backwards) being as follows: 94, 109, 115, 99, 96, 85. The fatal cases were widely distributed among 40 great towns, the highest number of deaths being reported from Birmingham 6, Stoke-on-Trent 4, Bradford, Liverpool, South Shields, Sunderland, Northampton, Walsall, each 3.

Measles also shows signs of abating, the figures for the last few weeks (working backwards) being 153, 187, 157, 141, 130, 119, 110, 78. There were 15 fatal cases each in West Ham and Liverpool, 9 in Middlesbrough, 5 in Leeds and Salford, 4 in Manchester. The deaths from measles during the first quarter of the year just past numbered 1315 compared with 411 during a similar period last year.

Whooping-cough caused 14 deaths in Liverpool, 6 in Birmingham, 3 in Oldham. Six deaths from diphtheria were reported from West Ham, 3 each from Hull and Leeds.

The number of stillbirths notified during the week was 238 (corresponding to a rate of 39 per 1000 total births), including 37 in London.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

Reassembly after Easter

THE House of Commons reassembled on Monday, April 9th, after the Easter recess.

Housing and Slum Clearance

In the House of Commons on Monday, April 9th, on the motion to go into Committee of Supply on the Civil Estimates and Estimates for the Revenue Departments, 1934,

Mr. HICKS called attention to the administration of the Ministry of Health in relation to housing.

Sir HILTON YOUNG (Minister of Health) expressed the hope that the House, the local authorities responsible for housing, and public opinion as a whole would follow from month to month and year to year, during the five years' programme of the Government, the actual achievements of the housing authorities in order to make sure that the programmes were carried out in time to achieve what the Government believed to be capable of achievement within the five years. It should be realised that they were still in the period of acceleration, when the great new effort had not yet come to the peak of its achievement in regard to pulling down the slums and putting further houses in their place. They had, however, already achieved such an increase of speed in the work as to assure them that, if it was continued, they would achieve the programme in five years. In other words, they were going fast enough already to get the work done in five years. The actual acceleration of slum clearance was best shown by the figures of the resolutions declaring clearance areas. That was a critical point—the point when the slum was actually declared to be a slum, and its clearance and the provision of fresh housing accommodation were made inevitable and certain. In the first year of the dawn of the idea of a campaign on the slums, the year which began on Jan. 1st, 1933, 200 local authorities declared 894 fresh areas. In the three months from Jan. 1st of the year to the end of March, the number of fresh areas declared had been nearly 1000. Therefore in the last three months more areas had been declared than in the whole of the preceding year, and they had already multiplied the rate of progress in slum clearance by four in the carrying out of the programmes. The curve was going up, because some of the biggest figures they had ever had were those for last March, when 347 fresh areas were declared. That carried with it the promise of a future increase sufficient to enable them to work up to the peak to which they had to work to get the programme achieved in the five years. He hoped it would be possible to shorten the time which it took to get the schemes through, and with experience of the working of the Act he believed that the local authorities would be able so to organise their machinery as substantially to accelerate the progress of the work. The Ministry of Health would promote that in every way they could, and there would be no delay there. It was not possible to abolish the inquiries because if they did they would not be sure that they were doing the work that they thought they were doing, and they might also be doing very great injustice to owners of property.

With regard to the activity in small house building, in the six months to the end of last September between 55,000 and 60,000 small houses for the lower-paid wage earners were built by local authorities and private enterprise combined. That compared quite favourably with previous years, and it was encouraging to observe that that activity continued, according to the best available information, undiminished. The lesson experience taught was that an uncontrolled subsidy was useless to cure the housing difficulty. That was the whole basis of the Government's policy, and it was being developed stage by stage at present. The second foundation-stone of the Government's policy was that, by the programme now being carried out with the assistance of public funds, backed by the whole housing energy and public opinion of the country, the slums should be no more. When that organisation was completed and the attack launched on the slum evil, the Government could go on to deal with overcrowding. That was a matter which, when the time was ripe, as it would be before long, he would be able to develop to the House.

The motion to go into Committee was agreed to.

HOUSE OF COMMONS

MONDAY, APRIL 9TH

The Drought: Emergency Measures

Mr. ATTLEE asked the Prime Minister what was the present position with regard to water-supplies in the country and what measures were proposed to meet the conditions arising out of the drought.—Mr. MACDONALD replied: The reserves of many water undertakers have fallen to a low level for this time of the year. The Government have been carefully watching the situation and, because of the continued absence of abundant rains, are satisfied that emergency measures must be taken. Therefore, in view of the seriousness of the position, the Government propose to bring legislation before the House immediately. The Minister of Health will present a Bill to-morrow. The second reading will be taken on Thursday.

Cheaper Milk for School-children

Mr. HALL-CAINE asked the Parliamentary Secretary to the Board of Education whether he had yet received the proposals of the Milk Marketing Board with regard to the scheme for supplying cheaper milk to school-children.—Mr. HERWALD RAMSBOTHAM replied: The answer is in the negative.

TUESDAY, APRIL 10TH

Supply of Milk to Necessitous School-children

Mr. McENTEE asked the Parliamentary Secretary to the Board of Education if he would give a list of those local education authorities which were exercising their powers under Sections 82 to 84 of the Education Act, 1921, only to the extent of providing free milk for necessitous children.—Mr. HERWALD RAMSBOTHAM replied: The following is a list of local education authorities who, during the month of February, 1934 (the latest period for which returns are available), exercised their powers under Sections 82 to 84 of the Education Act, 1921, only to the extent of providing free milk for necessitous children.

ENGLAND

Counties (5)

Cumberland
Derbyshire
Devonshire
Worcestershire
Yorkshire (N.R.).

Boroughs (23)

Bilston
Chatham
Chelmsford
Ealing
Gillingham
Gosport
Harwich
Haslingden
Hornsey
Kings Lynn
Middleton
Newark
Newcastle-under-Lyme
Penzance
Poole
Pudsey
Rochester
Rowley Regis
Sutton Coldfield *
Tiverton
Wallsend
Widnes
Winchester.

Urban District.—Hindley.

County Boroughs (6)

Chester
Darlington
Dudley
West Bromwich
West Hartlepool.
Wigan.

WALES

County.—Carmarthenshire.

Borough.—Pembroke.

Urban District.—Aberdare.

* It is exceptional for this authority to provide only milk. In returns for most other months a few ordinary meals are shown.

are open only to Members and Associates unless otherwise stated.

ST. MARY'S HOSPITAL INSTITUTE OF PATHOLOGY AND RESEARCH, Paddington, W.

THURSDAY, April 19th.—5 P.M., Prof. A. Bethe: Permeability and Osmo-regulation in Lower Animals.

ST. PAUL'S HOSPITAL, Endell-street, W.C.

WEDNESDAY, April 18th.—4.30 P.M., Mr. H. P. Winsbury-White: Stone in the Upper Urinary Tract. (Lantern slides.)

ROYAL NORTHERN HOSPITAL, Holloway-road, N.

THURSDAY, April 19th.—3.15 P.M., Mr. Hamilton Bailey: Scrotal Swellings. (Lecture-demonstration.)

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.

MONDAY, April 16th, to SATURDAY, April 21st.—First Week of Intensive Course in Laryngology, Rhinology, and Otology.

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE, Hammersmith, W.

DAILY.—2 P.M., Operations, Medical and Surgical Clinics.

MONDAY, April 16th.—10 A.M., Skin Clinic, Medical Wards. 11 A.M., Surgical Wards. [illegible] Surgical Wards, Eye and [illegible]

TUESDAY.—10 A.M., Medical [illegible] Wards. 2 P.M., Throat [illegible] Mr. Green-Armytage: Food and Childbearing.

WEDNESDAY.—10 A.M., Medical Wards, Children's Ward and Clinic. 2 P.M., Eye Clinic.

THURSDAY.—10 A.M., Neurological and Gynæcological Clinics. 11.30 A.M., Fracture Clinic. 2 P.M., Eye and Genito-urinary Clinics. 4.15 P.M., Lecture, Mr. Davenport: Conjunctivitis.

FRIDAY.—10 A.M., Skin Clinic. 12 noon, Lecture on Treatment. 2 P.M., Throat Clinic. 4.15 P.M., Lecture, Dr. W. S. C. Copeman: Rheumatism in Childhood.

SATURDAY.—10 A.M., Medical and Surgical Wards, Children's and Surgical Clinics.

The Lectures at 4.15 P.M. are open to all medical practitioners without fee.

UNIVERSITY OF BIRMINGHAM.

TUESDAY, April 17th.—3.30 to 5 P.M. (at the General Hospital), Dr. C. G. Teall: Radiological Examination of the Skull.

FRIDAY.—3.30 to 5 P.M. (at the Queen's Hospital), Dr. P. C. P. Cloake: Experiences in the Treatment of Diseases of the Nervous System.

MANCHESTER ROYAL INFIRMARY.

TUESDAY, April 17th.—4.15 P.M., Mr. A. H. Burgess: Electrosurgery.

FRIDAY.—4.15 P.M., Mr. W. R. Douglas: Demonstration of Surgical Cases.

ANCOATS HOSPITAL, Ancoats, Manchester (Post-graduate Lecture).

THURSDAY, April 19th.—4.15 P.M., Dr. E. D. Gray: Some Aspects of the Radiological Investigation of the Alimentary Tract.

LEEDS GENERAL INFIRMARY.

TUESDAY, April 17th.—3.30 P.M., Mr. Armitage: Demonstration of Surgical Cases.

SALFORD ROYAL HOSPITAL.

FRIDAY, April 20th.—4.15 P.M., Mr. E. D'Arcy McCrea: Demonstration of Surgical Cases.

GLASGOW POST-GRADUATE LECTURES.

WEDNESDAY, April 18th.—4.15 P.M. (at the Western Infirmary), Dr. John Gracie: Medical Cases.

Appointments

CUNNINGHAM, G. J., M.B. B.S. Lond., has been appointed Junior Assistant Pathologist to the Royal Sussex County Hospital, Brighton.

FINLAYSON, J. D., M.B., Ch.B. Glasg., Medical Officer of Health for Falkirk.

Certifying Surgeons under the Factory and Workshop Act: CHAPMAN, R. J., M.D., Ch.B. Edin. (Horsmonden, Kent); MOWLE, A. C., M.B. Camb. (Devizes); MURPHY, T. C., M.B. Ch.B., N.U.I. (Biddulph, Staffs); SOUTTER, J. S., M.B. B.S. Durh. (Hendon, Yorks); ZAIR, A. H., L.R.C.P. Lond., M.R.C.S. (Ludlow, Salop);

Vacancies

For further information refer to the advertisement columns

Albert Dock Hospital, Connaught-road, E.—Res. M.O. At rate of £110.

Altrincham Gener [illegible] H.S. At rate of £120.

Ashton-under-Lyn [illegible] Hon. Asst. Surg.

Assam Tea Estate [illegible]

Bermondsey Boro [illegible] £600.

Birmingham, Erd. [illegible] Asst. M.O. £650.

Bradford Royal [illegible] Surg., Res. Surg. O. £225. Also H.P. and two H.S.'s. Each at rate of £135.

Brighton Education Committee.—Asst. School M.O. and Asst. M.O.H. £500.

Bristol University.—Lecturer in Dental Mechanics.—£600–£700.

Burnley, Victoria Hospital.—H.P. At rate of £150.

Chester Royal Infirmary.—Hon. Asst. Radiologist.

Doncaster Royal Infirmary.—H.S. and Cas. H.S. Also H.S. to Ear, Nose, Throat and Eye Depts. All at £175.

Durham County Hospital.—H.S. £150.

Eastbourne, Princess Alice Memorial Hospital.—Two Hon. Anæsthetists. Also Res. H.S. £150.

East Ham Memorial Hospital, Shrewsbury-road, E.—Res. M.O. £200.

Hampstead General and N.W. London Hospital, Haverstock Hill N.W.—H.S. At rate of £100.

Harrogate Royal Bath Hospital.—Res. M.O. At rate of £156.

Hospital for Sick Children, Great Ormond-street, W.C.—Physician to Out-patients. Also Surgeon.

Huddersfield Royal Infirmary.—Jun. Cas. O. and Res. Anæsthetist. At rate of £150.

Ilford, King George Hospital.—H.S. At rate of £100.

Indian [illegible] Med. Officers.

Italian [illegible] *W.C.*—Hon. Asst. Phy.

Keighley [illegible] Asst. M.O.H. and Asst. School M.O. £500.

King's College Hospital, Denmark Hill, S.E.—Hon. Radiologist.

Lancaster Royal Infirmary.—Jun. H.S. At rate of £130.

Leamington Spa, Warneford General Hospital.—Res. Cas. H.S., &c. At rate of £150.

Liverpool, Broadgreen Sanatorium.—Asst. Res. M.O. £200.

Liverpool, David Lewis Northern Hospital.—H.P. At rate of £80.

London Homœopathic Hospital, Great Ormond-street, W.C.—Res. M.O. £100.

London Lock Hospital, 91, Dean-street, W.—Res. M.O. to Male Depts. At rate of £175.

Metropolitan Hospital, Kingsland-road, E.—Sen. and Jun. H.S.'s and Cas. O. All at rate of £100.

Middlesex Hospital, W.—Asst. Radiologist. £400.

Nottingham General Hospital.—H.P. At rate of £150.

Preston County Borough.—Asst. School M.O. £500.

Preston, County Mental Hospital, Whittingham.—Deputy Med. Supt. £750.

Queen Mary's Hospital for the East End, E.—Director of Pathology. £750.

Queen's Hospital for Children, Hackney-road, E.—Res. M.O. At rate of £200.

Reading, Royal Berkshire Hospital.—H.P., H.S., and Cas. O. Each at rate of £150.

Rochester, St. Bartholomew's Hospital.—H.P. At rate of £175.

Rotherham Hospital.—Cas. H.S. £150.

Royal College of Surgeons of England.—Examiner.

Royal Masonic Hospital, Ravenscourt-park, W.—Res. Surg. O. At rate of £250.

Royal Northern Hospital, Holloway, N.—Surg. Reg. Also Res. M.O.

St. Bride's, Pembrokeshire, Kensington Hospital.—Res. Med. O. £350.

St. Mary's Hospital for Women and Children, Plaistow, E.—Clin. Asst. to Gynæcological Dept.

Smethwick County Borough.—Sen. Asst. M.O.H. £750.

Southend Municipal Hospital.—Asst. M.O. £275.

Southend-on-Sea General Hospital.—Cas. O. At rate of £100.

South Shields, Ingham Infirmary.—Jun. H.S. £150.

Stoke-on-Trent, North Staffordshire Royal Infirmary.—Orthopædic H.S. £150.

West End Hospital for Nervous Diseases, Gloucester Gate, Regent's Park, N.W.—H.P. At rate of £150.

Western Ophthalmic Hospital, Marylebone-road, N.W.—Sen. and Jun. Res. H.S.'s. At rate of £150 and £100 respectively.

Wolverhampton and Midland Counties Eye Infirmary.—H.S. £150.

The Chief Inspector of Factories announces vacant appointments for Certifying Factory Surgeons at Kemnay, Aberdeen; and Kilbirnie, Ayrshire.

Births, Marriages, and Deaths

BIRTHS

ORCHARD.—On April 8th, at Kensington Court-place, the wife of Dr. Stuart Orchard, of a son.

RINK.—On April 3rd, at Welbeck-street, W., the wife of Dr. E. H. Rink, of a son.

SMALLSHAW.—On April 8th, at Sawley, Fir Tree-road, Epsom Downs, the wife of Dr. D. B. Smallshaw, of a son.

SPICER.—On April 2nd, at Welbeck-street, the wife of Captain W. R. C. Spicer, M.B., R.A.M.C., of a daughter.

MARRIAGES

MOWAT—GILCHRIST.—On April 3rd, at Overton Church, Lancaster, Allan Henry Mowat, F.R.C.S. Edin., to Edith Wilmet Swainson, youngest daughter of the late George Gilchrist, junior, Southport, and Mrs. Gilchrist, High House, Uley, Glos.

DEATHS

ANDERSON.—On April 7th, at Royal Masonic Hospital, W., Donald Drysdale Anderson, M.R.C.S., L.R.C.P., West African Medical Service, aged 37.

ANDERSON.—On April 6th, at a nursing home in Newcastle, James Anderson, M.D., aged 67 years.

DARKER.—On April 8th, suddenly, at Netherton Court, S.W., George FitzJames Darker, M.D., D.P.H., Barrister-at-Law, Middle Temple.

HARTT.—On April 1st, at Villa Montaigne, Lincombe Drive, Torquay, Dr. Charles H. Hartt, Colonel R.A.M.C., 2nd London Division (retd.), late of Greenwich, aged 87.

MACDONALD.—On April 7th, at Grasmere, Weymouth, P. W. MacDonald, M.D., J.P., formerly Medical Superintendent, Dorset Mental Hospital.

MELVILLE.—On April 6th, suddenly, Dr. Stanley Melville, Chandos-street, Cavendish-square, W.

PRICE.—On April 4th, at Addington-road, West Wickham, Kent, Dr. Ernest Henry Price, late of Cardiff and Brighton, aged 54.

SEPHTON.—On April 2nd, at the Manor House, Atherton, nr. Manchester, Robert Sephton, M.R.C.S., J.P., C.A., aged 90 years.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

ADDRESSES AND ORIGINAL ARTICLES

INDUSTRIALISED MAN AND HIS BACKGROUND *

By Leonard P. Lockhart, M.D. Camb.

MEDICAL OFFICER, MESSRS. BOOTS PURE DRUG CO., LTD., NOTTINGHAM; MEMBER INDUSTRIAL HEALTH RESEARCH BOARD

Not only in and around the main industrial centres but wherever economic life depends upon organised production and distribution there are certain aspects of industrial medicine which are also problems of general practice. With the possible exception of Greece in her prime medicine has rarely looked upon man's occupations with anything akin to approval. She has seen in them not so much a synthesis of mental, physical, and hygienic progress as a struggle carried on under conditions which did little to raise the level of the workers' lives. Ramazzini in the latter half of the seventeenth century noted occupational mutilations, poisonings, and ill-health, but we look in vain at contemporary social history for any constructive and preventive response to his disclosures. This apathetic attitude towards a great human problem was common to most social systems between the development of industrial technique and the coming of preventive medicine. To-day, however, occupational hazards are not merely recorded; they are studied and prevented in such a way that soon industrial disease ought to have been conquered.

Rationalisation of Industry

The solution of one problem is, however, but the beginning of another, which concerns not so much the prevention of occupational ill-health as the evolution of means whereby all work shall conduce towards a synthesis of mental, physical, and economic well-being in a social system where the rapid extension of applied science in daily life tends to falsify all predictions based on traditional data. We tend to regard this new order as beneficial or objectionable largely in terms of our personal reactions, but whether we manage to utilise it for man's progress or for his destruction depends entirely on the evolution and spread of ideas at present alien to the bulk of mankind.

Labour-saving machinery has increased, leading to the expansion of light industries and to the industrialisation of former handicrafts. There is a resulting tendency to employ less men and more women. Luxuries have gradually become popularised and standardised. An increasing proportion of employed persons are providing services as distinct from producing goods, while selling and distribution is almost an industry in itself. The power of the press, radio, and cinema in disseminating ideas or in manipulating mass emotions is enormous and the repercussions on employment and occupation incalculable. Clerical work is mechanised on almost an industrial basis and the potential output of each worker has been raised to the point at which increased non-working time, in the absence of vastly increased consumption both of services and goods, becomes almost inevitable either as unemployment or as increased leisure. The need for efficiency has called forth rationalisation with the unavoidable imposition of standardised methods of work, but the consequent reduction of individual scope has been somewhat offset by higher earning capacity and shorter hours. The larger organisations become the more must power be concentrated in fewer hands and rationalisation unwisely applied can almost sterilise an organisation of initiative and individuality. Rationalisation seems, however, to be a condition of survival in any highly technical society, and even medicine is not immune. We must, therefore, attempt some evaluation not only of its beneficial and pathological effects on health, but also of those attributes of it which we can utilise in the furtherance of preventive—or as Lord Horder puts it—constructive medicine.

BUT THE INDIVIDUAL WORKER HAS NOT CHANGED

A system which has evolved to the point of relieving man of much of his physical burden and of giving him a phenomenal power over the forces of nature has at the same time imposed a great and growing psychological burden. Looking at developing industrialism we might believe that man had taken certain tremendous strides and was capable of undertaking purely intellectual mental processes more or less divorced from emotional and instinctual traits. There is very little evidence to support this theory. Man may be more knowledgable, more richly endowed with technical skill, more capable of exercising power over the forces of nature, more adept at covering himself with a veneer of culture, but he is no more able to banish fear, jealousy, aggressiveness, or curiosity than were his nomadic forbears; nor does he appear to have grown markedly in wisdom. We have more complex means of expressing ourselves, more varied ways of masking our reactions and, moreover, we live in a world more pregnant with possibilities for touching up our emotional reactions—otherwise man is much the same. The conditions of the environment have, however, changed rapidly and changed fundamentally.

There are material advances such as better housing, clothing, transport, and food, but along with these there are factors which gravely disturb that sense of security and stability which is, in reasonable degree, so essential to physical and mental health and development. Rapid changes in means of production, in demand for particular goods, in organisation, and in ownership operating on an international scale hitherto unknown, have reduced work and employment for many to a precarious position. Uncertainty and a sense of insecurity may be inseparable from a phase of transition but they generate unhappiness and ill-health. Young men are having a very hard time to-day. Many jobs that formerly they could have done are now done by women with the aid of machines, while in the heavy industries, owing to immense world increases in production, employment is slack. It is no solution to replace women by men. Many of the jobs done to-day by women are not suitable for men. A man or boy is looking for a job for life on which to support a family. A girl wants a job until she marries, and quite apart from differences in pay is satisfied with a type of work that cannot possibly give satisfaction to a man. Other solutions than mere substitution must be found, but the fact that among general labourers one finds certificated officers of the Merchant Service shows how the channels for zeal and adventure are narrowed in our present state of economic transition. The disillusionments and harm done by short-term blind-alley occupations constitute another major problem, and militant political youth organisations abroad show how widespread is the need for outlets for male youth.

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* Substance of an address delivered before the Bournemouth Medical Society, Feb. 14th, 1934.

Some Clinical Data

With these points in mind let us consider some clinical data. Every year about 50 per cent. of the insured population go sick for an average of very nearly four weeks each, resulting in the loss of over half a million years of working time. This excludes the first three days of absence and it takes no account of loss sustained by those who remain at work and yet are relatively unwell and below normal efficiency.

Unfortunately there is no large scale analysis of the certified diagnoses and we are therefore driven back, not to analyse official figures but rather to consider what we mean by the labels we attach to patients for certification purposes. My thesis is that since the law requires diagnoses limited to one or two words it gets what it demands, but that these stereotyped descriptions of highly complicated processes are with few exceptions valueless to the student of social problems. The certificates deal largely with symptoms or with symptom-complexes to which orthodox labels have been given. They do not necessarily convey the real and often complicated clinical picture. They are not notes for a medical registrar. They are merely evidence that a person is ill and is entitled to sick benefit. Let us regard them in that light and not try to deduce clinical information from what is in effect an order to pay out money.

In a large proportion of instances the certified disease is not a clinical entity but the overt sign of a more fundamental disturbance, and because a patient suffers from gastric pain, lumbago, tachycardia, or frontal headache it is not, as I am sure you will agree, at all certain that he or she is suffering from organic disease of the stomach or heart or that rheumatism or eyestrain can be accepted as a satisfactory label. Rather are there in countless cases underlying causes which should remove the diagnosis into a totally different category. Dr. Maurice Cassidy, speaking as a consulting cardiologist (Brit. Med. Jour., 1934, i., 45), says that 29·5 per cent. of cases referred to him are psychoneurotic in origin. The symptoms are cardiac but the causative factors lie in the realm of psychological medicine. As with hearts, so I submit with many other things, particularly gastric cases. Further, a patient may have pneumonia or appendicitis or a fractured leg, and may be sick for a number of weeks. Is it statistically correct to label that patient with the original diagnosis for the full run of his or her absence? For the purposes of everyday practice it is, since differentiation is clinically difficult and administratively impossible, but it is not giving us a true picture of the patient's condition so to label it all the time. Most sickness statistics unless accompanied by a full clinical history of each patient can be, and I think are, misleading. We shall never get a true picture of the actual position in regard to the seventeen odd millions of people under N.H.I. We can, however, get accurately assessed samples. We can note significant points in special researches and can draw conclusions within a reasonable margin of error. When we get such an insight into representative samples we find gaps in our judgments of the so-called minor ailments —ailments which for producing inefficiency, unhappiness, and widespread secondary effects far out-distance the more spectacular, less frequent but objectively graver illnesses.

SICK ABSENCE DEPENDENT ON EMOTIONAL ENVIRONMENT

In 1927 the Industrial Fatigue Research Board (M.R.C.) (now the Industrial Health Research Board) began investigations into the various factors which operate within industry and commerce to raise or lower sick absence rates. The clinical and statistical difficulties encountered are set out at length in the various reports of the Board, but the conclusions reached by Prof. Millais Culpin and Dr. May Smith, who with the help of Prof. Major Greenwood carried out the bulk of this work for the Board, point to the fact that, leaving acute upper respiratory tract infections out of the picture, the amount of sick absence in any organisation is affected profoundly by conditions not of physical but of emotional environment. In the twelfth annual report of the Board the following summary is given :—

> "*Although it has not been found possible as yet to isolate in particular cases the causative factors in sickness absenteeism, yet there is evidence to support the hypotheses that a high rate may be expected where the following occur* : (1) rigidity of conditions ; (2) routine work offering few prospects of promotion for intelligent workers; (3) clerical as against productive or organising work; (4) badly selected departmental heads ; (5) anomalies of payment " (p. 25).

Apart from conditions of work and life there is another important factor—namely, the susceptibility of individuals to these conditions. In reviewing large numbers of workers in different occupations, Culpin found that some 50 per cent. of all persons studied—not sick persons but total staff—showed on investigation definite signs of nervous instability and that "there is a tendency for the nervous people to have more sick leave, not necessarily of the type diagnosed as nervous " (Rep. 61, p. 43). Farmer and Chambers (I.H.R.B., 11th Ann. Rep., p. 53) found the same correlation between nervous instability and a high accident rate.

The investigator in this work must have access not only to the documents but to the patients themselves and to their places of employment, and be able to interview large numbers of the staff who do *not* report sick. These are the essential requirements in any survey of the social and economic influences at work on the health of an industrial population. Such results as I personally have obtained, studying a mixed commercial and industrial population of some 17,000 male and female workers over a period of nine years, support in nearly every significant particular the work done by the Board and its investigators.

Apart from seasonal epidemics, sick absence varies *not so much* with occupation as with places of employment. It may vary within wide limits from as low as 2 days per person per annum to as high as 15. The variations are such that firm A and firm B in the same town, engaged in the same type of work and in other ways more or less comparable may present figures more or less steady year by year and yet differing widely between A and B. Large annual variations within a given group are rare but between groups they are common. These rates may, and indeed do, bear little or no relation to those of the general population surrounding them.

CORRELATION WITH LABOUR TURNOVER

If we search for a factor to correlate with the rates of sick absence we find a significant one in labour turnover, and it appears as definite that a high sickness rate and a high labour turnover go together. There are two main exceptions : (1) If a firm automatically dismisses its sick employees then it will have a high labour turnover rate but a low sickness absence rate ; (2) in certain other occupations where labour turnover is low sick absence is relatively high. The explanation in these cases is not so simple. While fatigue, dislike of the work, and general discontent will tend to a high sick absence rate, and while a degree of security is necessary for happiness and health, *complete* security is rather a double-edged weapon. There must, it is true, be the minimum of factors tending to unease a staff if you would keep your sick rate low, but so too there must be no insurmountable obstacles in the way of reasonable change of occupation within the organisation nor to the desire to leave it altogether should the urge arise. If then in a well-run organisation you institute, say, a pension scheme on terms that make severance of connexion inseparable from financial loss, and if too you put people on a set of occupational rails that they cannot leave even for a parallel set during the whole course of their working life, and if further you institute a purely seniority system of promotion you may, and indeed in most cases you do, find a disproportionate amount of sick absence. A condition will have been set up which Culpin has termed "rigidity of occupational conditions" and this, just as much as insecurity, fatigue, and discontent or dislike of the work, leads to increased sick absence. Briefly, an organisation run on enlightened lines will tend to have a low sick absence rate more or less in proportion to the amount of scope available for reasonable ambition and individual effort.

RELATION TO INCENTIVES

Sickness varies too according to the system of incentives incorporated in the payment of wages. It is generally higher for staff employees than for those "on the clock." It goes up along with the accident rate when overtime is worked consistently for long periods. It falls, quite apart from any money incentives, when the department or firm is called upon to make a special effort and tends to rise slightly afterwards if the effort has been prolonged. Short spurts may reduce sick absence without a corresponding rise to follow. I submit that these facts, not in one firm nor in one service but in many firms and covering many thousands of workers, point to some causative agents for much of our sickness which do not yield their secrets to the radiologist, the pathologist, nor to the physician who thinks of a patient isolated from his environment in terms mainly of organic disease. The results of extensive investigations suggest that we are not dealing with physical disease so much as with symptoms of ill-health, not necessarily physical all the time or even fundamentally any of the time. There is a profoundly significant suggestion that much, very much, of it is psychoneurotic in origin, even if its overt form simulates organic disease. I would go so far as to assert that well over half the time lost among the insured population due to ill-health is psychoneurotic. I do not suggest that half the *cases* are of this nature, but half the lost time is, I believe, to be explained mentally rather than physically. The time taken to recover full function even after such a disorder as a fractured radius or a lobar pneumonia depends to an extent, too little recognised, not only on the patient's temperamental make-up but on the emotional background of the home and of the conditions of employment.

Does malingering play an important rôle in producing and prolonging absence from work? Except as an odd case in special circumstances I cannot see what incentive there can possibly be for anyone willingly to forego wages for sickness benefit and risk in addition the possible loss of his or her job. When the time comes for sickness benefit to fall to the level of disablement benefit a large proportion of persons "sign off" and return to work, but that can be better explained along other lines. I suggest two explanations which will cover nearly all such cases. In the first place the patients who make this sudden decision to return to work at the end of 26 weeks are almost invariably cases of frank psychoneurosis or of organic disease or trauma which has passed into a psychoneurotic phase. In the absence of treatment directed towards the solution of their mental problems they hang on hoping to feel better, and finally, faced with no prospect of complete cure by physical means, and finding that they cannot live on their disablement benefit, they choose the lesser of two evils and return to work. Their subsequent history is often one of economic inefficiency lasting many more months. The second explanation is that sympathetic understanding without self-discipline is as detrimental to a patient as hard discipline with no understanding. If either the doctor or the employer is unwise in the giving of indiscriminate sympathy sickness can be indefinitely prolonged and only terminated by economic hardship. Correct diagnosis and appropriate treatment ought to eliminate both these categories. It is not correct, however, to call these people malingerers.

Emotional and Instinctual Reactions

It is necessary to be quite clear that we are discussing a problem in social medicine and that the sincerity of the medical certificate which is given by the doctor in a fiduciary capacity is not being called in question. If any blame is to be attached let it be to a system of medical education which ignores occupational, social, and domestic environments, and emotional and instinctual reactions to them.

The following diagnoses are common—nerves, nervous or general debility, anæmia, and neurasthenia. They are all unfortunate, particularly the last two, for the anæmias generally have normal blood counts and the label of neurasthenia sticks closer than a brother. While many may forget for what a particular abdominal scar once stood, no one ever forgets once he is labelled neurasthenia. It is a highly respectable, sympathy-producing condition. It tends to become a continually recurring excuse for evading life's responsibilities and it should never be hastily nor lightly diagnosed. The bulk of the cases are anxiety states and should be dealt with as such, but the word "neurasthenia" is a very harmful one. The difficulty of fixing the correct label to many of these cases must be admitted because, while a patient may forgive his doctor for misdiagnosing pneumonia as appendicitis, he finds it very hard to forgive him for writing anxiety neurosis or emotional dysfunction on the certificate. Moreover, if the doctor does this it is not long that his patient is left in peace, since bureaucracy still too often regards psychological ill-health as a crime, while very few approved societies admit even the existence of psychotherapy. Patients and officials demand something concrete and physical even if it is wrong, rather than something correct obtained at the price of an abstract diagnosis; but the problem is a very real and urgent one since the patient takes his cue from the written certificate and expects to recover only as a result of treatment directed towards the cure of the stated disease.

The Regius Professor of physic at Cambridge has recently been pleading for a psychological outlook on such disorders, but the lack of a biological outlook in administrative circles is one of the great obstacles; a similar lack in the patient, and especially in his employer, can cause a doctor many difficulties, but if we take a firm stand even approved societies must eventually come into line. Financially they have everything to gain and nothing to lose by doing so. Some have done so already.

It would be impossible for any practitioner to carry out adequate psychotherapy on all the patients who needed it. The time factor would rule such a proposal out of court, but if we regard the sickness problem as largely capable of evaluation in psychological terms we shall have gone a long way towards the solution of one of the economic problems of our time. We are not only concerned with persons who actually incur loss of time and earning capacity, but with an even larger body of people who, though they remain at work, experience times of relative inefficiency, often long and not infrequent.

Modern economic life demands qualities in those who bear its responsibilities, even if in quite a humble sphere, wholly different from the qualities which made for success and efficiency in the premechanical days. Much of the best work in the world, as Dr. J. R. Rees reminds us, is done by neurotics and much of the control of their work is in the hands of people who do not understand this. Moreover, intense competition has produced a tension throughout the whole industrial and commercial structure.

THEIR DIAGNOSIS

I do not think that many of us can lay our hands on all the data necessary for making a diagnosis where the function of organs is impaired by processes other than obvious and demonstrable organic disease. The private doctor knows the home life and often the early childhood and upbringing of his patients, but he cannot know much, if anything, about their working lives unless he is fortunately placed. Where industry has taken upon itself to establish its own medical service the industrial doctor can supply the private practitioner with an entirely new facet of the problem and the two working together do, I think, stand a much better chance of arriving at the correct solution than if each should work in ignorance of the other.

If modern economic development is the foster-parent of psychoneurotic ills it is also the means whereby groups are formed sufficiently large to enable this joint medical enterprise to develop. It should prove of great value in the evolution of preventive or constructive medicine. The doctor attached to a large organisation has as great an opportunity as the general practitioner if he will but use it. He knows a corporate society (for such is a large modern firm) sufficiently well to assist in making the most of each individual's abilities and he can place at the disposal of the private practitioner facts and opinions which are often essential to correct diagnosis. Industrial and private medicine are not competitors but essential allies and co-partners.

It is true that there are only about fifty whole-time industrial doctors in this country, but just as industry and commerce are as vital to healthy living as the schools, so industrial medicine will ultimately spread just as school medicine has done. In the meantime, hosts of small firms would gladly employ the services of a local practitioner for a few hours a week if employers felt that we as a profession were determined to study and grasp the problems of industry and commerce. We ignore these things in our medical education and very few develop interest afterwards. The gulf between the consulting-room and the office, factory and shop is wider and deeper than we care to admit.

AND THEIR TREATMENT

If we concede, as we must, that psychotherapy should only be attempted in its more elaborate forms by competent clinical psychologists, there yet remains a vast amount of work to be done on quite simple lines by such a coöperative partnership as I have mentioned. I refer to that mass of clinical material which, whether at work or on sick leave, suffers from what the patient describes as nerves, depression, anæmia, or even as "just proper run down." It includes cases of cardiac dysfunction, dyspnœa, neuritis, and of aches and pains innumerable. Insomnia, indigestion, and irritability form a very imposing rearguard to a list by no means complete. In my own sphere I see about a thousand such cases a year. That is in an organisation with a low sickness rate, a happy contented staff, and first-class management. Evidence is plentiful as to the widespread nature and importance of these so-called minor ailments and to the extensive unhappiness and misery that they cause. In the bulk of cases there is a disturbance of emotional balance due to causes which may be simple or complex, serious or trivial—i.e., to the observer; for to the patient nothing can be trivial which deprives him or her of the full enjoyment of health and happiness. Perhaps it is the fear that others will regard these things as trivial which causes patients to be so reticent about them. Hence the importance of a highly trained nursing staff in industry to make the necessary contacts and to bring the cases to notice.

We may admit that the seeds of disturbance and maladjustment are laid in early childhood and that occupational factors only act as detonators to a charge already laid but, be that as it may, simple measures will often effect a cure. By cure I mean a sufficient degree of insight on the part of the patient to enable him or her to acquire psychological immunity.

Three Common Types of Disorder

The obsessional, the anxiety, and the hysteric are the three common types and it is to Millais Culpin and May Smith that industry owes a great debt for making us recognise their significance in a highly organised environment.

(1) The obsessional with his unreasoning drive in regard to work, hyperconscientiousness, *sentiment d'incomplétude* of Janet, compulsions, repetitions, and feeling of uncertainty. The patient who must go through work several times (often a fixed number of times) and has the utmost difficulty in leaving a job that he knows to have been quite satisfactorily and conscientiously finished; who dislikes observation and is generally a person of great reliability, thorough rather than brilliant. When he breaks down it is attributed to overwork, whereas the breakdown, and in extreme cases the suicide, are, together with the excessive urge to work, only symptoms of a deeper psychological state.

(2) The anxiety type is apprehensive and often states that when faced by superiors he loses control of his thoughts. The type who may regard all subordinates as constituting a hypercritical judgment on his actions, and who consequently fails in positions of authority or who breaks under the strain of controlling his feelings, who imagines at all times a most improbable worst except, as in some cases quoted by Raymond and Janet, when he knows he has done something worthy of censure. These patients specialise in so-called D.A.H., tachycardia, and epigastric pain.

(3) The hysterical type is largely recruited from Jung's extrovert class who find in physical symptoms their escape from intolerable situations whilst saving their *amour propre* intact. "No, I didn't take that post—you see I had awfully bad luck—I was ill at

the time." Is not that illness the result of being offered promotion to a job which the patient knew he was incapable of filling? Illness is the escape mechanism, for there is no stigma attached to ill-health that is physical; but we cannot yet discuss psychoneurotic ill-health without being accused of imputing insanity or malingering, while hysteria placed on a certificate might result in the patient losing his job, especially at the hands of an employer who happened to be an intolerant extrovert. But in the privacy of the consulting-room the patient can be shown how his physical symptom is an escape. On the whole patients take the suggestion well, and often face life anew. I know many, and they are now doing well in posts which previously they had evaded on the honest but pathological grounds of physical incapacity.

AND THEIR EFFECT IN INDUSTRY

When vested with authority what havoc these maladjusted persons can play with other people's lives. Imagine one of your anxiety type, in a position of control over a number of subordinates, finding compensation in an aggressive or overbearing manner; and how, if given the power and the requisite detonator, which may be quite a trivial matter, he may hold over several people the fear of dismissal; and since the exercise of power by these people is often highly capricious, how devastating the results may be.

Gastric pain and so-called D.A.H. have a high correlation with the anxiety states and are found not only in such superiors as I have just sketched, but in their victims who when even normally balanced in their emotions may easily become pathological with a few months of such treatment. These people exist in fairly considerable numbers, and in large concerns it is vital that no manager should be given power of dismissal that is not subject to review by an independent authority. Power to-day tends to become concentrated in ever fewer hands, and the larger things get and the more "rationalised" they become, the greater is this tendency. Where power in the hands of an emotionally unbalanced person operates unchecked it gives rise to a high labour turnover, a high sick absence rate with an increase of gastric and cardiac cases.

The obsessional type comprises a high proportion of the very efficient, but to work for an emotionally unbalanced obsessional is to experience the fringe of Dante's inferno, especially if he cannot bear to delegate responsibility and must be kept informed about every detail, which he criticises with meticulous care. Unfortunately he often earns from his superiors a wholly unwarranted reputation for being indispensable.

The economic factors which touch up people's varying temperaments differ greatly. Some are content with everything except perhaps the foreman, others look out upon this complexity of engineering, economic and administrative machinery, and wonder whether they count for very much. They tend to regard themselves as cogs in the mechanism and develop, maybe, into malcontents, maybe into patients. The man who is unemployed may rage openly at the street corner or symbolically in the sick-room at the machinery which he regards as his enemy, while the ambitious lad from school may lose his interest in work or develop into a clinical or criminal problem.

There are countless factors in industry and commerce to-day which give rise to clinical problems calling for much coöperation between medical practitioners and those engaged administratively. The most valuable help about such cases can be obtained by making study of conditions of work in the firms which employ your patients, and the emotional is more important than the physical background. Of course excessive hours, bad ventilation, and undue strain must be corrected, but once these things are put right, it is the psychological environment that needs elucidation.

Prevention Easier than Cure

Psychological disorder is easier to prevent than to cure, and hence our educational system must aim at fitting children for life as it will probably be lived thirty years ahead rather than as it was thirty years ago. No person, in my opinion, should hold any position of authority over human beings in industry or commerce who has not had a sufficiently broad biological outlook inculcated as shall enable him or her to understand the place of instinct and emotion in human life and temperament. This educational reform is, I believe, at the root of constructive social hygiene in the future. In the day continuation school attached to my own firm we have, with the approval of the Board of Education, instituted elementary general biological training as a cultural subject, and I have great hopes of its development and value but it is as yet in its infancy. It has demonstrated that few children from the schools to-day have the vaguest idea of the place of man in the scheme of things, no knowledge of the romance of human development, and little innate urge towards physical and mental integration. It is possible to obtain this even after the age of 14, but it should be begun very early if it is to bear the best fruit. We must not, however, confuse the creation of thousands of half-baked biologists, which would be futile, with the basic need for a general and cultural biological outlook, which is essential.

Economic development is evolving towards a high degree of organisation and interdependence, and medicine is slowly but surely finding its place in this structure. We must not condemn rationalisation and high-grade organisation, for it appears to be a necessity of survival in a mechanical and scientific age, but we must integrate the new developments with our medical policy.

Correlated medical services in school, industry, commerce, and home must be evolved within an economic scheme which has for better or for worse become organised and rationalised on a vast scale. The fact that much work is still done by small-scale methods does not in the least detract from the argument. The troubles attributed to modern industrial and commercial methods are more than likely to be but the troubles of a phase of transition, but if they are to pass we need to have a people more mentally and physically integrated than we have at present, more psychologically adult and more determined to be masters of their own destinies. Medicine has an enormous new rôle to play in education, constructive planning, and in therapy. Much more interest must be taken in coöperation with educationists and with the leaders of industry and commerce in the evolution of training and of methods of employment. While as regards treatment much can be done within industry in such a way as to interfere as little as possible with production and earning capacity.

I hope we shall not let our opportunities slip away in any mistaken belief that modern economic tendencies are of no real or abiding significance to the practice of medicine in its fullest sense.

THE ADRENOGENITAL SYNDROME*

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The occasional occurrence of secondary male sex characters in the female has long been known, but remarkable advances have been made since 1905 when Bulloch and Sequeira [1] first brought into prominence the relation between the precocious appearance of secondary sex characters and the presence of cortical tumours of the adrenal. My interest in the condition was first stimulated some eight years ago by my colleague, Dr. Gordon Holmes, who asked me to remove the adrenal from an adult with similar symptoms. A few cases had already been reported in which tumours, both simple and malignant, had been surgically removed as a remedy for the syndrome, but its association with cortical hyperplasia had not then been recorded except in the post-mortem room. Dr. Gordon Holmes's case proved on laparotomy to belong to the hyperplastic variety, so we ventured to remove the larger adrenal. It was the forerunner of the present series of cases.

The condition has been described in detail in three previous publications,[2-4] and I propose here to deal with it in a more general way, mainly from the biological point of view.

Clinical Features

The syndrome may be defined as that condition in which secondary male sex characters appear in the female, and it is associated with a retrogression of the primary and secondary feminine characters and their functions. The main changes, which depend upon the time of onset, may be briefly described as follows. (1) The appearance and disappearance in the female of hair according to the male pattern and distribution. (2) Alterations and bodily contour towards the male sphere: broadening of the shoulders relative to the pelvis; overgrowth of muscle and bone, lessening of the subcutaneous fat, and a coarsening in the texture of the skin; enlargement of the clitoris; and deepening of the voice. (3) Immature development of the female genitalia, both internal and external; absence or under-development of breasts; degenerative changes in the ovaries giving rise to amenorrhœa, either primary or secondary, or disturbances of menstruation. (4) Alterations in the psychological outlook towards the male type.

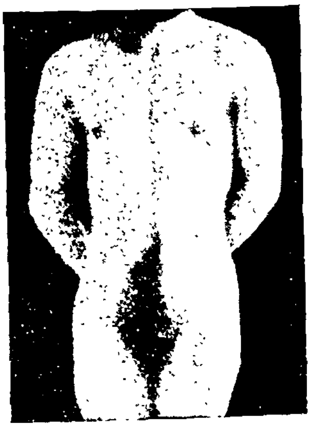

FIG. 1.—Group I. Case 2 of summary.

As the numbers in the series increased, it became possible, in 1932, with the coöperation of Dr. Gardiner-Hill and Dr. Greenfield, to publish a paper [5] in which the cases could be classified into three groups:—

I.—Adrenal pseudohermaphroditism, in which the changes were declared at puberty, and were accompanied by primary amenorrhœa.

II.—Adrenal virilism, in which the changes appeared after a normal puberty, and were followed by disturbances in the menstrual function or secondary amenorrhœa.

III.—Mild virilism in association with other endocrine disturbances occurring after puberty—the fat type.

Since then I have been able to add a fourth group—post-menopausal virilism.

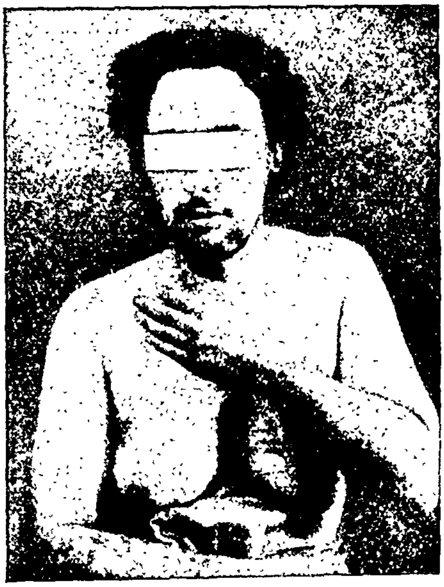

FIG. 2.—Group II. Case 11 of summary.

Group I.—It will be seen from the accompanying illustrations that the earlier the onset the greater the degree of virilism. There is obviously a masculinising factor at work, and if it starts at some time before puberty, when active bodily growth and sexual development takes place, it will change the figure of a woman to that of a muscular man. In the patient shown in Fig. 1 there is much hair of male distribution, the clitoris is enlarged, and the feminine characters have dwindled. The uterus is infantile, the ovaries are cystic, the patient has never menstruated, and she has no breasts.

Group II.—Most of our cases belong to this group in which changes are not so well developed. Here the onset of virilism is after puberty, and averages from 15 to 18 years in the series. Menstruation starts normally, but at the time of onset of the virilism, or soon after, there is an upset of its normal rhythm and duration, and secondary amenorrhœa may supervene. The uterus is small and the ovaries degenerate. There are other signs of endocrine imbalance at this stage; some of these patients become fat, and while the majority lose this fat and remain adrenal in type, others retain it and drift off into multiglandular types. The male build and male distribution of hair are well marked in the illustration of this group. (Fig. 2.)

Group III.—The case illustrating this group (Fig. 3) is anomalous in that the male element, as shown by abnormal hair and enlarged clitoris, is not marked; the infantile uterus, cystic ovaries, and amenorrhœa conform to type; but a third element has crept in, as shown by the abnormal deposition of fat. This increase in weight dated from the onset of virilism and the cessation of the menses at the age of 16. This particular case has been previously published, and Dr. Gardiner-Hill considered that the adrenal formed part of a multiglandular syndrome; since then, however, he has inclined to the view that the case is probably one of Cushing's basophil adenoma of the pituitary.[5] The differences in this group from the others will be alluded to under the various headings, but at any rate it gave us a valuable hint of an association between the adrenal and pituitary. Intense headaches of the migrainous type with fits of depression are common in these cases, and the possibility of their being of pituitary origin must be considered.

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* A Hunterian lecture delivered before the Royal College of Surgeons of England on Jan. 19th.

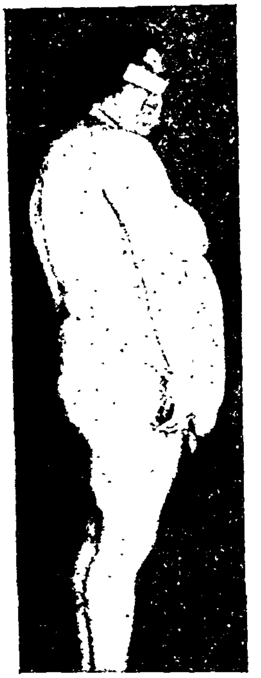
FIG. 3.—Group III. Not operated upon. Similar to Case 3 of series.

Operative Results

In a series of 15 cases, summarised in the accompanying Table, our experience of the effect of unilateral adrenalectomy on the main symptoms has been very gratifying in Group II., but not in Groups I. and III. There has been a fairly uniform disappearance of the male characters, and a quicker restoration of the feminine functions. It will be seen that the adrenals have been removed from one or other side, so it is natural to infer that they are both involved in the pathological process. The smallest of the glands excised was within the normal limits, yet the clinical result was very satisfactory. Thus we have been able to establish the important fact that virilism is independent of the size or hypertrophy of the adrenal.

In Group II., as already stated, the average age of the onset of virilism is 18 to 20, after a normal puberty, so the syndrome has developed in the comparatively short space of four years, and has not become too fixed. The removal of one adrenal, usually the larger, has been sufficient to swing the balance from the male towards the female sphere. The main features of recovery are the shedding of hair and the return to normal menstruation. The acquired hair can be pulled out in bunches, with little or no pain, within a few days of the operation. In some patients the hair becomes white at the tips, and in others a slight sex colour differentiation has appeared. The subject of hair is a delicate problem with women. With virilism they will adopt any alternative rather than shave, and after adrenalectomy they are equally unwilling to pull this hair out.

The menses show a gratifying return to normal, even after prolonged periods of amenorrhœa, and the injection of œstrin has been of considerable value in the more obstinate cases. In one recent case operation was followed by a complete depilation of male hair within a fortnight, and a period within three days after seven years' amenorrhœa. There is as yet no apparent injury to their general health; their complexions become rosy, their minds are happy, and in some of the cases with the reappearance of feminine functions there has been a return to the finer points of feminine interest.

In Group I. operation after puberty is far too late to have any chance of changing characters which have become fixed. If it were possible to diagnose virilism before this date, then earlier operation should have equally good results. The problems of Group III. will be discussed later.

The operation is a difficult one, and demands a technique and care of its own. I feel it has been justified by the contribution it has made to research. There is at present only one indication for operation—namely, that the case belongs to Group II., and it is to be hoped that operation on other types will be undertaken only with the genuine idea of making additions to knowledge.

Laboratory Investigations

The laboratory investigations undertaken have been: first, chemical and metabolic (in which I have had the help and advice of my colleague, Mr. Jocelyn Patterson, Ph.D., and of Mr. J. Adler); and, secondly, histological.

In the chemical and metabolic investigations we have travelled hopefully on a long road but have failed to arrive at any very definite results. We have examined the blood calcium, phosphorus, cholesterol, and urea, the gastric juice, the blood-sugar, the sugar-tolerance curves, and the effect of insulin on the fasting patient. This last experiment was designed to see what resistance the patients had to insulin, and the blood was examined at half-hourly intervals. All these tests were within normal limits, except for slight differences in the cholesterol and sugar metabolism. The blood cholesterol was definitely raised in Group III. cases. The sugar-tolerance curves in most of the cases showed some distortion from the strictly normal response, in that there was a normal elevation from the fasting stage, but a slower return to normal. The majority of curves came out on the high side, making the average above normal, and the highest were of the Group III. type. The insulin test was generally unsatisfactory from the point of view of drawing any conclusions, but as a whole there was a tendency to show a resistance to insulin. The immediate result of operation on the sugar-tolerance curves was negligible, and in one remote result, also Group III., there was a further decrease in the sugar tolerance. (Fig. 4.) In the few cases of the Group III. type, there was a definite increase in the red cell count. From these results it will be seen that the main differences from normal standards

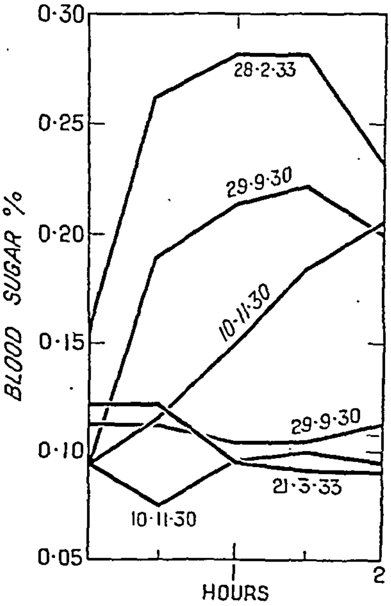

FIG. 4.—Sugar-tolerance curves from a case of Cushing's syndrome submitted to unilateral adrenalectomy. The three upper curves represent the sugar-tolerance curve taken before, immediately after, and some time after operation. The lower curves represent the sugar-tolerance curve after the administration of 10 units of insulin.

SUMMARY OF CASES

Group.	Age.	Date of operation.	Degree of virility.	Hair.	Periods.	(a) Voice. (b) Breasts.	Outlook.	Genitalia.	Clitoris.	Fuchsin reaction.	Result.
I.	15	Sept., 1927.	+ + +	Marked.	Prim. amen.	(a) Low. (b) Under-developed.	Normal.	Ut. inf.	+ + +	Left strong.	Very slight change. Abroad.
I.	22	Sept., 1928.	+ + + +	,,	,,	(a) Rough. (b) None.	Indifferent.	Ut. inf. C.O.	+ + + +	,,	Very slight change.
III.	18	Oct., 1930.	+	Slight.	Amen. 18 mths.	(a) and (b) Normal.	Childish.	,,	+	Right strong.	Loss of hair. No change.
II.*	21	June, 1929.	+ +	Moderate	Amen. 10 mths.	(a) Deep. (b) Small.	Normal.	Ut. small.	Normal.	Left strong.	Good result. Loss of hair. Periods regular. Married. Son since op. Very good.
II.	22	Oct., 1930.	+ + +	Marked.	Irregular.	(a) Rough. (b) Smaller.	,,	Ut. small. C.O.	+	,,	Menses regular. Hair less, coming out. Headaches less severe. Friends remarked on improvement. More feminine. Very good.
II.	20	July, 1931.	+ +	Moderate	Amen. 1 year.	(a) Normal. (b) Small.	,,	,,	+	,,	Good. Periods fairly regular. Hair not coming out so easily as at first. More interested in life.
II.	21	Mar., 1932.	+ +	,,	Regular.	(a) and (b) Normal.	,,	Ut. inf. C.O. (left).	Normal.	Right strong.	Hair less. Comes out easily. Periods regular; happier. Good.
II.	29	June, 1932.	+	Very marked.	Amen. 9 mths.	(a) Normal. (b) Smaller.	Homosexual.	Ut. inf. C.O.	+	Left mod.	Not much change. Bedridden before and after operation: four periods since.
II.	20	July, 1932.	+ +	Moderate	Irreg. amen. at times.	(a) Harsh. (b) Normal.	Normal.	,,	+	Right mod.	Hair comes out easily. Periods regular. Outlook improved and changed to normal. Very good.
II.	18	Aug., 1932.	+ +	,,	Late onset irreg.	(a) Normal. (b) Grew with menses.	Indifferent.	,,	Normal.	Right strong.	Hair comes out easily. Periods now regular. More feminine in outlook.
II.	30	April, 1933.	+ + +	Marked.	Regular.	(a) Deep. (b) Smallish	Normal.	Ut. small. Fibrous O.	+	Left fairly marked.	Good. Hairs white at ends, pull out easily. Periods regular. Complexion imp.
II.	35	May, 1933.	+ +	Fairly marked.	Amen. at 26.	(a) Deep. (b) Smaller.	Male tendencies.	Ut. small. Big C.O.	+	Left strong.	Amenorrhœa continues. Brighter outlook. Much the same. Fair.
II.†	32	Nov., 1933.	+ +	Marked.	Regular, ceased 26.	(b) Small.	Normal.	Small fibroid in ut., small C.O.	+ +	Left fairly marked.	Period started two days after operation. Hair all out in two weeks. Very good.
II.	26	Aug., 1933.	+ +	Fairly marked.	Irreg. Ceased 20.	(b) Smallish.	Homosexual.	Ut. inf. C.O.	. .	Left mod.	Hair coming out. Periods regular. Outlook brighter and more normal. Very good.
IV.†	54	Oct., 1933.	+	Marked. Bald.	Hyst. R. ovariot. 38.	(a) Roughish. (b) Normal.	Disgusted with herself. Sensitive.	Remaining left ovary cystic.	+ +	,,	Hair all out in two weeks. Slight growth on head. Very good.

* Married since operation. † Married. Prim. amen. = Primary amenorrhœa. Ut. inf. = Uterus infantile. C.O. = Cystic ovaries.

affect Group III. as regards sugar tolerance, cholesterol, and blood count.

In examining the histological material, I was fortunate again in enlisting the help of my colleague at Charing Cross Hospital, Dr. H. W. C. Vines. We argued that if there was no cause to be found in the arrangement or shape of the cortical cells, there might possibly be a difference in function, and by using the Ponceau fuchsin stain he was soon able to show that in all my cases of unilateral adrenalectomy the cytoplasm of the cells of the cortex contained a vivid red granular material, mainly in the inner and middle zones. This colour varied in intensity, and was most vivid in the adrenal already shown, which in size was within normal limits, suggesting that the response was as much qualitative as it was quantitative in the cases of hyperplasia.

To exclude the possibility of post-mortem changes taking place in the adrenal, a further control series was started by removing portions of normal adrenal in the course of performing kidney operations. These were all negative to the stain, as were all normal post-mortem adrenals. We were able to collect from colleagues several autopsy specimens of tumour associated with virilism, and these were positive, showing that the fuchsinophil material in the cells is capable of surviving post-mortem conditions. Interesting as this discovery was, it seemed unlikely that we had hit upon some isolated reaction in the adult, so a further search was made into the fœtus. Dr. Vines obtained a strong fuchsinophil reaction in the male fœtus between the ninth and seventeenth week; while in the female fœtus the reaction was not so strong, and of shorter duration, lasting from the eleventh to the fourteenth week. After the twentieth week it was absent in both sexes. This observation may well prove to be one of fundamental importance in the elucidation of many difficulties. It establishes a very early and passing phase in the embryo, common to both sexes but less marked and of shorter duration in the female.

In the other tissues of the body traces of this reaction were found in the interstitial cells of the testis, the corpus luteum, and the anterior lobe of the pituitary.

Anatomy and Embryology of the Adrenal Gland

In order to give a clear idea of the background of our work, it is necessary to refer briefly to the comparative anatomy of the adrenal, and to trace the steps which have led to the formation of this highly specialised organ.

In its primitive form the cortex is separate and intimately connected with the reproductive system. It then becomes associated with the cells of quite a different system—the sympathetic—which ultimately forms the medulla. It appears first in fishes, and then increases in importance, so that it becomes essential to life in the higher animals. In sharks and rays the two cell-systems are separate; the cortex is known as the interrenal body and is associated with a marked development of the sexual system. In amphibians (frogs) the two cell-systems make a definite advance towards each other, and are arranged in a chain along the dorsal segments, until we find them intimately mixed in reptiles and birds to form a solid organ. In mammals and man the medulla becomes completely enclosed with the cortex, and the method by which these sympathetic cells wander into the cortex in man has not been observed even in the higher apes. From the nature of such a migratory process it is not uncommon for cells to become detached, and to form accessory adrenals, which may contain the elements of one or the other, or of both these cell-systems.

In man the adrenals are situated over the upper poles of the kidneys, and at birth reach the maximum size of their development, when each is about one-third the size of the kidney. The cortex then undergoes an astonishing and rapid process of absorption and regeneration until the size of the gland is reduced to one-thirtieth of that of the kidney. The glands enlarge at puberty, during pregnancy and the menses. Between the fourth and fifth decade they reach their zenith and then gradually undergo a senile involution. It occasionally happens that this adult stage of the gland is present at birth, in which case the fœtus is born a brainless monster, so that it has been thought that the cortex is in some way connected with the development of tissues rich in lecithin.

In point of time the cells of the adrenal cortex can be recognised about the fourth week, and are derived from the same mass of cells—the genital ridge—which also give rise to either the testis or ovary. There is thus a common origin for the cortex and sex gland. The determination of sex takes place about the seventh week, and, as we have noted, the appearance of the fuchsinophil reaction commences some two to four weeks later.

Our clinical evidence and operative results have established a very marked connexion between this reaction and a condition of maleness in the female, and this naturally suggested the possibility that "the substance so staining must be closely related to or even identical with the male hormone or its precursor," [6] while its presence in the intercellular spaces further suggested that it acts via the blood stream.

Crew [7] states that "so far as is known, the sex chromosome mechanism is the sex determining mechanism, but in many cases this mechanism can be overridden and the sex of the individual determined in other ways." It is therefore reasonable to argue that a strong and prolonged male phase in the female fœtus may possibly be one of those factors which so determine sex; to what extent is still a matter of conjecture. Dr. Vines has obtained a positive reaction in true hermaphroditism, and it is probable that sex reversal, from female to male, will come to be included in this category. But we do know that the cells of the adrenal cortex retain the power of developing this substance into adult life, and that it may become activated at certain periods of physiological stress, such as puberty. If we accept this explanation then it readily accounts for Groups I. and II., which we have already considered clinically.

However, Group III. warns us that the problem is not so simple as this. It may be argued that in adult virilism there is a failure on the part of some feminising influence to counteract the male phase. The brief duration of this male phase in the female fœtus suggests that it is suppressed, and this suppression is due to some mechanism dependent on the functional activity of the other endocrine organs. That there is some such mechanism was found by Dr. Vines in two female fœtuses, in which a prolonged male phase was accompanied by a definite hyperplasia of the pituitary. Hence virilism may be due to a failure to maintain the normal balance between the anterior lobe of the pituitary and the male adrenal. This type would be associated with a pituitary dysfunction, the clinical picture being determined by the predominance of one or the other factor, and when the pituitary dysfunction is in the ascendent there is a shift towards the type of basophil adenoma of the pituitary described by Cushing.

Clinical Conclusions

From an examination of some 60 cases with virilism of varying degree, a few general conclusions may be drawn.

That heredity plays a part there is no doubt. A family history of hirsutism was present in a quarter of the cases, and in these it was twice as common on the distaff side. On the male side it ranged from grandfather, father, to brothers; on the female, from mother, sisters, aunts, daughters, and nieces—more frequent in aunts and sisters. It thus appears to be transmitted more on the female side. There is slight evidence that the condition is associated with the events which occur at birth. It occurred in two cases of twin births, one case of premature birth, and in one case in a four-year-old daughter within three months of its onset in her mother. With regard to other endocrine disturbances, it appeared in two patients whose mothers suffered from Graves's disease, in one from whose mother I removed a parenchymatous goitre, and in one whose mother suffered from diabetes. In one case of mild virilism there were symptoms of hyperthyroidism. One point of practical importance must be stressed, and that is women with virilism are comparatively infertile, as one would expect from the nature of the pathology. If they conceive they are apt to miscarry. On the other side, one of my early patients who had amenorrhœa before adrenalectomy, has since married and produced a son.

The syndrome does not appear to be recognised by gynæcologists. In this series one patient had been curretted, and two patients had had hysterectomy, one of them with unilateral ovariectomy. From the nature of the pathology described such interference is only likely to aggravate the condition of virilism.

General Discussion

So far we have discussed the problem only in its more extreme form. The study of the whole series of cases suggests that the adrenogenital syndrome is not a disease but is a definite deviation from the normal evolutionary process. In this respect we have to think in terms of a normal and transient phase in fœtal physiology, which by its persistence gives rise to the abnormal in the adult. I believe it forms a very definite streak in the human species and some of its minor stigmata are fairly common. Nor is it confined to our species alone. We have observed a similar syndrome with a similar pathology in the adult hen. These sex changes are more common in some of the lower animals, who should afford ideal material for research.

If our suggestion of the male hormone proves correct further considerations become apparent. It corroborates the theory of bisexualism, at any rate so far as the female is concerned—a theory whose truth has frequently been assumed but remains unproved. The altered sex outlook which has been observed in these patients, and which reverts to the normal after operation, raises the question of an endocrine basis for certain types of mental abnormality, and this will have to be taken into consideration in adjudicating on medico-legal affairs. The question of heredity has already been referred to, but it is to the eugenist that the problem offers a wide field of research. The presence of the adrenogenital syndrome in man is a retrograde movement, since it tends towards the intersex type. Is it stationary, receding, or increasing? If the latter, then we may be the innocent spectators of an evolutionary process drifting slowly and inevitably into the neuter state. The conditions of life are rapidly changing. The emancipation of women has been a big change; there is over-population in many parts of the world; there are many factors in our social lives leading to race deterioration, and they must react on the individual. Too many minds, content with their lot and unaware of these abnormalities in others, decry this so-called tampering with nature. Theirs is a selfish attitude; but in clinical science there is a spirit of altruism which aims at projecting our acquisitions to the betterment of the human race.

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HOSPITALS FOR WOMEN AND CHILDREN.—Last year the South London Hospital for Women and Children, of 140 beds, 25 of them in private rooms, admitted 2518 women and children, while out-patients made more than 69,000 attendances. The cost of maintenance during the current year is estimated at £25,000, and a further £2000 is needed for laying new floors in the wards.—In 1933 the Princess Elizabeth Hospital for Children at Shadwell had 1797 in-patients and 14,689 out-patients, the latter a large increase. The Bailey Convalescent Home at Bognor received 324 patients, and the result of the year's working was a reduction of the bank loan by £2000. Proposals are in hand for the extension of this hospital, which has become seriously inadequate, at a cost of £37,000, of which only £10,000 is at present available.—Owing to the closing of the institution for two months while the out-patient's department was being enlarged, and other improvements made, Paddington Green Children's Hospital last year received only 713 in-patients as against 845 in 1932. Their average stay was 15·13 days and their average weekly cost £3 19s. 1d. Patients paid £626 towards the total expenditure of £11,766.

THE LYSIS OF FIBRIN BY STREPTOCOCCI:

ITS APPLICATION TO THE PROBLEMS OF RHEUMATIC INFECTION IN CHILDREN

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IN 1933 Tillett and Garner, of the Johns Hopkins University, showed that the filtrates of young broth cultures of hæmolytic streptococci of human origin are capable after a remarkably short period of incubation of completely liquefying human fibrin, and in this respect appear to be unique amongst pathogenic bacteria of clinical importance. Animal fibrin proved totally resistant to liquefaction unless produced by the action of human thrombin on animal fibrinogen, and of 18 strains of hæmolytic streptococci of animal origin only 3 were fibrinolytic to human fibrin.

These results may explain the power of hæmolytic streptococci to invade human, as opposed to animal, tissues and throw some light on the anomalous results which have followed attempts to reproduce human streptococcal disease in such animals as the rabbit whose fibrin is totally resistant to streptococcal fibrinolysis. They certainly open up a new line of investigation into the problem of streptococcal immunity.

In their first paper Tillett and Garner showed that when recent and fairly remote streptococcal infection could be excluded, all specimens of human fibrin were susceptible to fibrinolysis, whereas the fibrin from cases recently recovered from such infection often proved totally resistant. They considered this phenomenon of "resistance" might ultimately prove to be a specific response to streptococcal infection due to the development of specific antifibrinolysins analogous to the specific antihæmolysins which are known to be produced against streptococcal hæmolysin (Todd, 1932).

They have recently published another paper with Thomas (1934) in which this opinion is considerably strengthened. Total resistance was found regularly to follow hæmolytic streptococcal infections such as erysipelas, scarlet fever, and streptococcal tonsillitis, but usually not until convalescence was established. It was not found associated with infection by any other micro-organism. In erysipelas "resistance" developed shortly after the temperature fell and persisted for several months. In scarlet fever it was delayed for three to four weeks and persisted for a few weeks only. Purulent streptococcal complications hastened the onset of resistance.

Total resistance to streptococcal fibrinolysis is certainly a remarkable phenomenon; it is always associated with recovery, and, whilst it may be premature to regard it as a specific immunity response, the evidence points in no uncertain way in that direction.

Bacteriological Investigations

We have tested the susceptibility to fibrinolysis of 130 samples of human plasma and the fibrinolytic power of 30 strains of streptococci showing β-hæmolysis on blood plates, and have confirmed the main conclusion arrived at by Tillett and Garner (1933), and Tillett, Thomas, and Garner (1934).

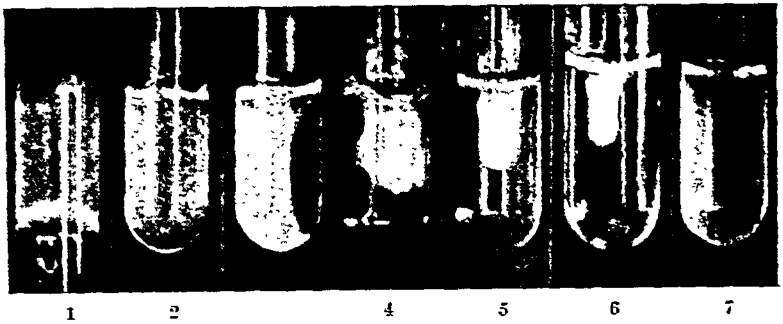

FIG. 1.—Streptococcal fibrinolysis. 1. Clotted plasma. 2–7 stages in liquefaction of clot, which took 28 minutes.

We have used the original technique of Tillett and Garner with slight modifications. Blood was obtained by vein puncture and collected over potassium oxalate (0·02 g. to 10 c.cm. of blood) in centrifuge tubes and tested within 24 hours of collection. The streptococci were grown in buffered meat-infusion broth for 18 hours and the reaction, which was usually in the region of pH 6·0, was brought to pH 7·2 by means of a phosphate buffer solution. To 0·2 c.cm. of plasma diluted with 0·8 c.cm. normal saline was added 0·5 c.cm. of broth culture and 0·25 c.cm. of a 0·25 per cent. solution of calcium chloride solution in saline and the mixture incubated in a water bath at 37° C.

In from 8 to 12 minutes a firm solid coagulum forms and the tube can be inverted without the loss of more than a drop or two of fluid. Incubation is continued, if necessary, for 24 hours. With many normal plasmas complete lysis of the clot takes place in 12 to 25 minutes, and the large majority are completely liquefied under an hour provided a powerfully lytic strain of coccus is used (Fig. 1). Exceptionally complete liquefaction is delayed for four hours. On complete lysis the fluid becomes turbid, the turbidity depending on its original fibrin content, and has a finely granular appearance; all trace of clot disappears. If partially resistant, lysis is delayed for varying periods up to 24 hours, by which time it may be complete or there may still be light or heavy flakes of fibrin floating in an opaque fluid; formed clot is absent. When totally resistant, the clot may have shrunk slightly at the end of 24 hours, there is little change in its appearance or consistency, and the little fluid in which it is suspended remains water-clear.

In all our tests we have used at least three strains of lytic streptococci and at least one, usually several, susceptible plasmas as controls. This is a necessary precaution.

Occasionally an unexplained "lag" occurs in liquefaction even of normal plasma clots. This appears to be due to some change in the culture consequent upon repeated subcultivation, as it is rarely found with freshly isolated and strongly lytic strains. It sometimes corresponds, in a culture originally containing "matt" colonies and their "glossy" variants, to degradation into a "pure glossy" growth, but this can neither be the whole nor the usual explanation as the delay, which may amount to 1½ or 2 hours, may occur when this change is absent. We have found, however, that incubation of the digest at 52° C., after the formation of a firm clot has taken place at 37°, will often hasten lysis.

VARIATION IN FIBRINOLYTIC POWER

We have found that hæmolytic streptococci vary very considerably in their power to liquefy a normal plasma clot. They fall fairly accurately into three groups: the first in which fibrinolysis is rapid and complete; the second in which it is slower but eventually, in approximately double the time taken by cultures in the first group, the clot is completely digested; and a third in which lysis is slow and still incomplete at the end of 24 hours.

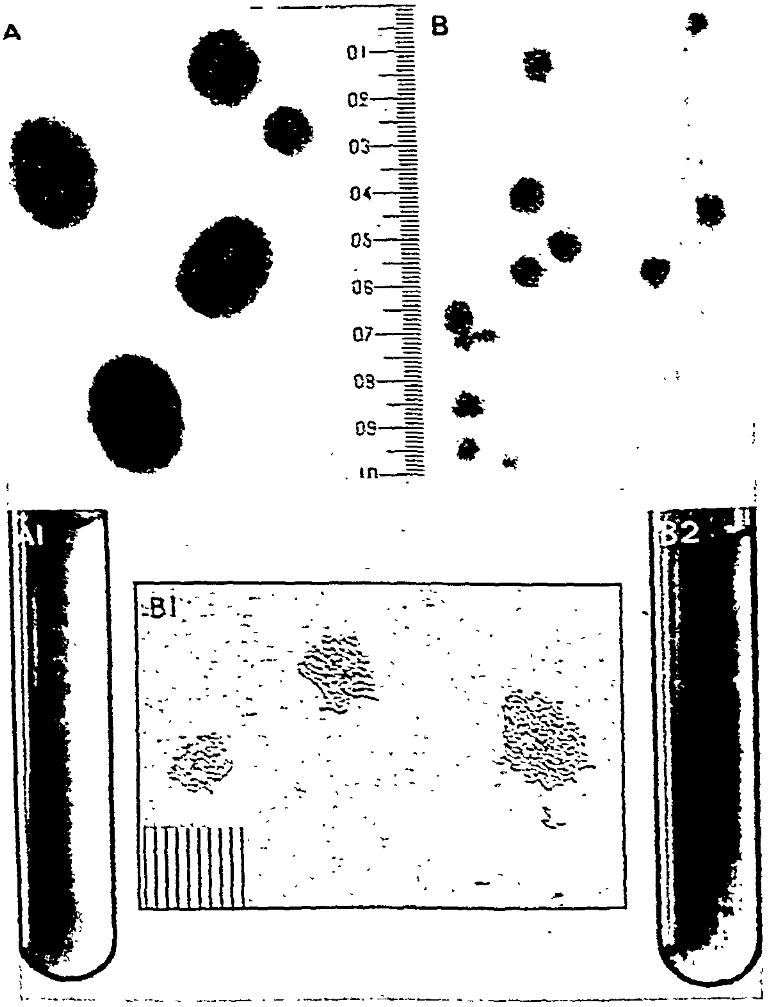

FIG. 2.—A. "Glossy" colonies magnified 64 diameters; (24 hours' growth). A1. Broth culture of A which had little or no fibrinolytic action. B. "Matt" colonies magnified 64 diameters; (20 hours' growth). Scale is 1 mm., graduated in tenths and hundredths, magnified to the same degree as A and B. B2. Broth colonies of B which were powerfully fibrinolytic. B1. Young "matt" colonies of a powerfully fibrinolytic strain magnified about 285 diameters; (6 hours' growth). Each division of the scale represents a two-hundredth of a millimetre.

Our strains were distributed amongst these groups as follows :—

Group I.—(5 strains)

	Strains
Scarlet fever with purpura	2
Scarlet fever	1
Fatal puerperal septicæmia	2

Group II.—(6 strains)

Fatal puerperal septicæmia	1
Fatal general peritonitis	1
Impetigo	1
Streptotoccal tonsillitis	3

Group III.—(19 strains)

Scarlet fever	8
Streptococcal tonsillitis	5
Subacute rheumatism (children)	4
Tooth socket	1
Udder of streptococcal mastitis (cow)	1

All strains were tested for acid production and their capacity to hydrolyse sodium hippurate. By this method one apparently bovine strain was found in Group III. in addition to the strain known to be of bovine origin. All other strains were regarded as being of human origin.

This grouping suggests that fibrinolysis is an attribute of those streptococci which produce severe human infection. None of the strains in Group III. were from cases suffering from a general or a severe infection. The majority of those in Groups I. and II. were from such cases. Our numbers are obviously too small to justify a definite opinion on this point, but they were suggestive enough to encourage further inquiry in this direction.

Except with one strain from a case of fatal puerperal septicæmia of a few days' duration we found that all cocci in Groups I. and II. produced a granular deposit in broth without general turbidity and their colonies were "rough" or "matt." Of the 11 strains in these two groups 4 produced "bread-crumb" colonies which were small, had a very irregular edge and a "matt" surface (Fig. 2). When examined at a magnification of about 400 diameters before becoming visible to the naked eye these colonies were seen to consist of a few extremely long chains very loosely coiled together and throwing out loops at the edge, which thus appeared irregular (Fig 2). This "matt" appearance was present but not so well developed in all the remaining strains except one in these two groups. The exception had the colonial characters of the cocci in Group III. These were, without exception, of the glossy or smooth variety with a "porcelain" surface and a sharp edge; their microscopic colonies were composed of tightly packed short chains; there was no looping at the edges.

Although it is doubtful if "roughness" and "smoothness" amongst streptococci is the same phenomenon as the similar variation found among other bacterial races, "roughness" in streptococci is usually regarded as being closely associated with virulence. That, with one exception, all our most powerfully fibrinolytic strains were rough strengthens the impression gained by studying their source that fibrinolysis and virulence to man may prove to be closely related.

Further support for this view is given by the results of virulence tests which were applied to the majority of the cocci of each group. Quantities varying from 0·5 to 0·0001 c.cm. of young broth cultures were injected intraperitoneally into mice, uniform distribution of cocci being obtained by centrifugalisation and suspending the deposited cocci in distilled water. Four strains tested for virulence in Group I. gave an average minimum lethal dose of 1/2000 c.cm., the average lethal dose of 3 strains in Group II. was 1/50 c.cm., while of 5 strains from Group III., 0·5 c.cm. of four of these failed to kill mice in four days and one was fatal in this dose only in five days.

A complete investigation of the carbohydrate reactions of all strains revealed no reaction or group of reactions which could be correlated with the grouping described above based on fibrinolytic power except that, as a general rule, the final acidity after four days' incubation in 1 per cent. glucose was greater in the feebly fibrinolytic Group III. than in the other groups. (Average for Groups I. and II., pH 6·1, for Group III., pH 5·0.)

After our primary growths had been subcultured about ten times, it was noticed that several of the strains in Group II. were losing their fibrinolytic power and their broth cultures were becoming turbid. We therefore retested the majority of our strains against normal plasma clots after about 30 subcultures had been made. Two strains originally in Group I., both originally isolated from cases of scarlet fever, and both originally producing "pure matt" growths on nasgar were found to be growing in "pure glossy" form and had lost almost all their fibrinolytic power. Three strains, originally in Group II., all isolated from cases of streptococcal sore-throats, had undergone a similar degradation. Of our 11 actively fibrinolytic strains, therefore, fibrinolysis appeared to be a relatively permanent characteristic in 6.

No exact correlation could be established between hæmolysin production and fibrinolysin production. It was a general rule that strongly fibrinolytic strains were also strongly hæmolytic as judged by their effect in the usual dilutions after one hour's incubation with a constant dose of sheep's red cells; 4 weakly fibrinolytic strains however were found to produce relatively large amounts of hæmolysin.

RELATION OF FIBRINOLYSIS TO FIBRIN CONTENT

If fibrinolysis is not a specific attribute of hæmolytic streptococci, susceptibility to lysis should be related to a low, and resistance to a high, fibrin content of the clot. The fibrin content of 60 specimens of blood was determined by removing and washing the clot from a known volume of plasma and accurately weighing it after drying to constant weight.

The figures obtained are shown in Table I. :—

TABLE I

Fibrin content. (Mg. per 100 c.cm.)	Cases in which plasma clot was—		
	Completely dissolved.	Partly dissolved.	Totally resistant.
Between 300 and 400	8	1	..
" 400 " 500	24	2	..
" 500 " 600	9	0	..
" 600 " 700	3	3	2
" 700 " 800	2	1	..
" 800 " 900	1	..	1
" 900 " 1000	1	..	..
" 1000 " 1100	0	..	..
" 1100 " 1200	1	..	..
" 1200 " 1300	0	..	..
" 1300 " 1400	1	..	..

Included in the first group is a case of pneumococcal lobar pneumonia whose plasma contained 1400 mg. of fibrin per 100 c.cm. This exceptionally heavy clot was completely digested in 25 minutes by a streptococcal culture. Another case in which the fibrin content was 830 mg. per cent. and the plasma clot completely lysed, was proved to be suffering from acute streptococcal septicæmia following lateral sinus thrombosis, and the coccus identified as belonging to the viridans group. In contrast with these cases the plasma clots from two cases of hæmolytic streptococcal infection proved totally resistant to the lytic action of powerfully lytic strains, although their fibrin content was between 600 and 700.

We feel justified in concluding, therefore, that susceptibility and resistance to fibrinolysis is in no way related to the fibrin content of the plasma, a conclusion which lends strong support to the view that digestion of the plasma clot is a specific effect, and resistance to fibrinolysis a specific immunity response.

Resistance to Fibrinolysis in Rheumatic Infection

As a certain amount of evidence has recently accumulated which suggests that hæmolytic streptococci play an important rôle in the production of rheumatic infection in children, we investigated the plasma of 44 children suffering from rheumatic heart disease for resistance to fibrinolysis.

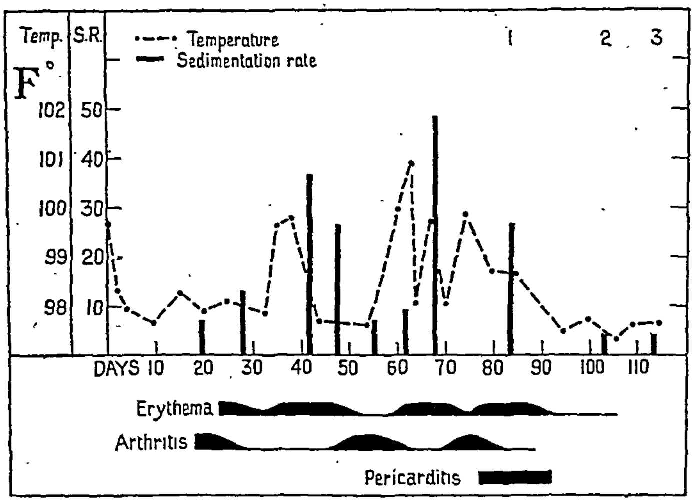

FIG. 4 (Case 2).—Changes in temperature and sedimentation-rates in relation to erythema, arthritis, and pericarditis. At 1 the plasma clot was totally resistant to fibrinolysis; at 2 and 3 it was completely dissolved.

The cases were divided into two groups, those in which there had been a recent acute or subacute attack of infection or relapse of infection and in whom some clinical evidence of activity persisted at the time of examination, and those presenting no clinical evidence of active disease.

The clinical signs by which activity was recognised were: (*a*) fever; (*b*) joint pains with or without arthritic effusion; (*c*) elevation of the sleeping pulse-rate, as advocated by Schlesinger (1932); (*d*) appearance of new or an increase in previously recognised physical signs, such as pericardial friction; (*e*) loss of weight; (*f*) subcutaneous nodules. In some cases relapse was preceded by sore-throat.

It is generally agreed that the sedimentation-rate of the red blood-cells is an accurate clinical index of activity of infection in rheumatic children (Payne 1932, Bach and Gray Hill 1932, and Struthers and Bacal 1933), and it has been the experience of one of us (C. B. P.), based on over a thousand estimations of the sedimentation-rate in 163 cases of rheumatic carditis in children in all stages of the disease, that this estimation is probably the most reliable guide we possess to activity of rheumatic infection. It may rise before relapse is clinically manifest; without exception it remains high during its course and well into convalescence.

Our active cases are therefore divided into those in which the sedimentation-rate was over and those in which it was under 20.

Every case of serious active infection fell into the first group and the plasma clot of nearly half these cases was found to be completely resistant to fibrinolysis at some period during convalescence. Active cases with a sedimentation-rate under 20 were always those in whom relapse was relatively mild or who were studied at a late stage of relapse. In one only of these cases was the plasma clot completely resistant; in one-third of these cases there was considerable and abnormal delay in liquefaction. All the quiescent cases showed complete digestion of the clot usually well within the period found for normal bloods. Twenty-six children in the same age-period as the rheumatic children (5 to 15 years) were selected as controls. In none was there any manifestation or history of recent hæmolytic streptococcal infection. In all of them plasma clot was normally susceptible to fibrinolysis, and no instance of total resistance to fibrinolysis was found on examination ot the blood of 28 adults similarly selected as controls. Tillett, Edwards, and Garner tested the plasma clot of 30 "normal" adults and of 14 children and 16 adults suffering from various "non-streptococcal" diseases. Of their 60 controls fibrinolysis took place in four hours or less in 58, in one child it was delayed for 24 hours, but eventually complete, and one case, a child with a history of acute otitis media, which might well have been of hæmolytic streptococcal origin,

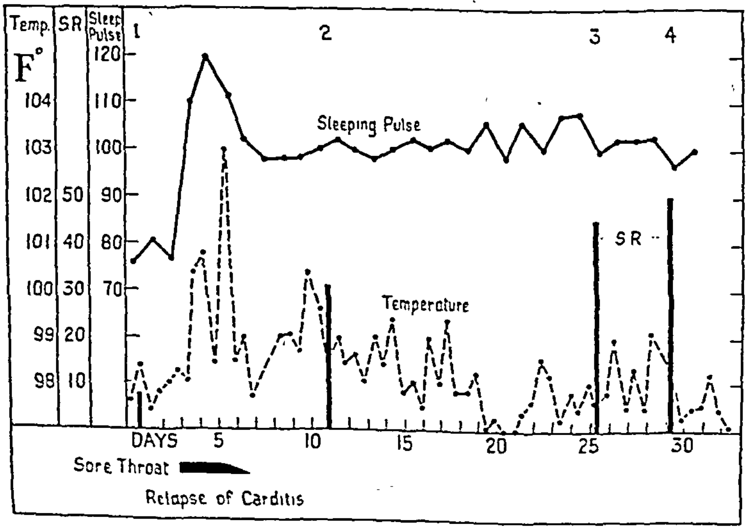

FIG. 3 (Case 1).—Temperature, pulse-rate during sleep, and erythrocyte sedimentation-rate, during a period of sore-throat followed by a relapse of carditis. At 1 the plasma clot was completely dissolved; at 2 and 3 it was completely resistant at 4 it was again completely dissolved.

was resistant. Taking these figures together, one case of total resistance to fibrinolysis has been found amongst 114 specimens of blood from individuals apparently not suffering from hæmolytic streptococcal infection (0·87 per cent.); whereas 12·5 per cent. of our 44 cases of children suffering from rheumatic carditis had totally resistant plasma clots, and in every resistant case there was clear evidence of active infection. Further it is very probable, judging from the results of Tillett, Edwards, and Garner in erysipelas, scarlet fever, and streptococcal tonsillitis, that we missed the period of "absolute resistance" in some of our severe cases, as they found this period may be delayed until the thirtieth day or even later in convalescence, and occasionally to last for as short a period as a week. This point could only be investigated by repeatedly bleeding each active case, a proceeding which is almost impracticable in the case of nervous children under the age of ten.

The following are the notes of cases selected from our series to show the relation between clinical signs and resistance or susceptibility of the plasma clot to fibrinolysis—in active cases with the sedimentation-rate over 20 (Cases 1 and 2); in an active case in which the rate was under 20 (Case 3); and in a quiescent case (Case 4).

CASE 1.—Girl, aged 13 (see Fig. 3). August, 1933: acute relapse of carditis with left-sided pleural effusion and many subcutaneous nodules. October, 1933: relapse with pericarditis. Gradual improvement with gain in weight and fall in sleeping pulse-rate to below alert pulse, and almost complete disappearance of nodules (a few doubtful remnants persisting on knees) by Feb. 19th, 1934, when the sedimentation-rate was 7, and on fibrinolysis test the clot was completely dissolved. Feb. 21st: fever and tonsillitis; streptococci present in throat swab. Feb. 26th: loss of 3 lb. in weight. March 1st: aortic diastolic murmur noted for first time; sedimentation-rate 30; fibrinolysis test, clot completely resistant. March 5th: pericarditis; hæmolytic streptococci present in throat swab. March 15th: pericarditis still present; sedimentation-rate 44; fibrinolysis test, clot completely resistant. March 20th: clinically improved; pericardial rub no longer heard; sedimentation-rate 49; fibrinolysis test, clot completely digested.

CASE 2.—Boy, aged 15 (see Fig. 4). Nov. 11th, 1933: pains in arms and legs and joints with swelling of the joints. Nov. 17th: admitted to hospital; no definitely abnormal cardiac physical signs; fleeting swelling and pain in all joints; marked erythema marginata over the whole body. Dec. 6th: sedimentation-rate 5. Dec. 15th: sedimentation-rate 12. Dec. 24th: much improved; erythema persists. Dec. 29th: rise of temperature; relapse of joint pains; apical systolic murmur; sedimentation-rate 34. Jan. 3rd, 1934: nodules on flexor tendons of hands; pains better. Jan. 4th: sedimentation-rate 23. Jan. 11th: sedimentation-rate 35. Jan. 19th: sedimentation-rate 9. Jan. 23rd: fresh rise of temperature with precordial pain and pericardial rub. Jan. 26th: sedimentation-rate 49. Jan. 31st: fresh rise of temperature with joint pains. Feb. 13th: nodules still present; no cardiac enlargement; no apical systolic murmur; no joint pains or rash; sedimentation-rate 27; fibrinolysis test, clot completely resistant. March 5th: all physical signs disappeared; sedimentation-rate 2; fibrinolysis test, clot completely dissolved. March 16th: steady improvement; sedimentation-rate 2; fibrinolysis test, clot completely dissolved.

CASE 3.—Male, aged 12½ years. Heart found bad at the age of three. Several relapses of rheumatism and carditis since then. August, 1933: acute relapse of carditis and arthritis; considerable cardiac enlargement, mitral stenosis, and aortic incompetence; steady improvement with gain in weight. Jan. 1st, 1934: slight pyrexia; no change in physical signs; sedimentation-rate 5. Jan. 15th: sedimentation-rate 4. Jan. 25th: pyrexia and rash; ? rheumatic erythema marginata; no definite change in cardiac physical signs; some loss of weight. Jan. 29th: sedimentation-rate 32. Feb. 19th: better again; sedimentation-rate 13; fibrinolysis test, clot partially resistant.

CASE 4.—Aged 8. Rheumatism and carditis, October, 1932, followed by relapse of rheumatism a year later. Steady improvement with gain in weight and decrease in abnormal cardiac physical signs. Feb. 19th, 1934: no cardiac enlargement and only soft apical systolic murmur; sedimentation-rate 9; fibrinolysis test, clot completely dissolved. March 5th: very well; sedimentation-rate 7; fibrinolysis test, clot completely dissolved.

Table II. summarises the results of fibrinolysis tests in rheumatic children :—

TABLE II

Rheumatic heart disease.				Controls.
Fibrin clot.	*Recent attack or relapse.*		*Quiescent.*	—
	Sedimentation-rate—			
	Over 20.	Under 20.		
Resistant ..	4 (44·4 %)	1 (8·3 %)	0	0
Partially resistant..	1 (11·1 %)	4 (33·3 %)	0	0
Susceptible .	4 (44·4 %)	7 (58·3 %)	23 (100 %)	26 (100 %)
Total ..	9	12	23	26

Discussion

All the available methods of measuring streptococcal immunity indicate that it is short in duration and relatively slight in degree. The estimation of anti-fibrinolysin and anti-hæmolysin production shows the same irregular results as the estimation of anti-bacterial, antitoxic, and allergic antibodies. It appears likely, however, that the determination of the resistance to fibrinolysis, provided a powerfully lytic strain of coccus is used, can be carried out with less elaborate precautions than agglutination and precipitin tests, and, as resistance appears to follow the majority of hæmolytic streptococcal infections, its determination may prove more generally useful than an attempt to determine the degree of antitoxic immunity by skin tests, as many strains produce little or no toxin.

Resistance to fibrinolysis apparently due to anti-fibrinolysin production bears a close analogy to the production of antihæmolytic antibody. Todd (1932), Coburn and Pauli (1932), and, more recently, Myers and Keefer (1934) have shown that hæmolytic streptococcal infection is often followed by a considerable increase in the anti-hæmolysin titre of the blood, and that patients with active rheumatic infection show a similar rise as often as do patients with frank hæmolytic streptococcal infection.

The number of fibrinolysis tests on rheumatic children here recorded is too small to draw definite conclusions, but the relation between total and partial resistance and clinical activity is close enough to suggest that a short-lived immunity to hæmolytic streptococci follows each attack of infection.

As far as they go our results are in accord with the findings of Todd, of Myers and Keefer, and of Schlesinger and Signy, and furnish additional immunological evidence that hæmolytic streptococci play an important part in acute and subacute rheumatism, even if they furnish no proof of its streptococcal origin.

Conclusions

(1) Broth cultures of 11 out of 30 strains of hæmolytic streptococci were found to liquefy human

fibrin rapidly. (2) The majority of these lytic strains were isolated from cases of severe human infection, and with one exception their colonies on solid media were "rough" and they were virulent to mice. (3) Weakly fibrinolytic strains had glossy colonies and were much less virulent. (4) The liquefaction of human plasma clot by hæmolytic streptococci is not related to its fibrin content. (5) Total resistance to fibrinolysis appears to be a specific immunity response to infection by hæmolytic streptococci. (6) The plasma clot of children suffering from acute and subacute rheumatism was frequently found to show total resistance to fibrinolysis.

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THE TREATMENT OF PROFUSE BLEEDING FROM THE STOMACH AND DUODENUM

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THERE is no general agreement about the principles on which cases of profuse bleeding from the stomach and duodenum may best be treated. This is unfortunate, because severe cases, where the bleeding is grave enough to threaten life, often come under the care of hospital residents and practitioners whose individual experience of the emergency is not great. The main choice lies among three courses of action: purely medical treatment, medical treatment plus blood transfusion, and surgical treatment. The conservative teaching recommends medical treatment only, and in the absence of an extended experience of other methods the wise course is clearly to follow that teaching. It is usually coupled with the comforting assurance that very few cases so treated die. It is doubtful, however, whether the fatal cases are in fact few enough to offer much comfort, when it is remembered how common profuse bleeding is. Published figures vary from Hurst's 2½ per cent. mortality among cases admitted to Guy's Hospital on account of hæmatemesis or melæna and not previously operated on, to Chiesman's 25 per cent. mortality among cases admitted to St. Thomas's Hospital for gross hæmatemesis and melæna. Statistics on this subject are particularly difficult to appraise, because no exact limit can be set to the degree and recency of bleeding that justifies admission of a case to a series, and because statistics take scant account of the very variable circumstances and features of different cases. Nevertheless, it does seem clear that approximately 10 per cent., at least of the moderately severe cases, die. This is no negligible minority. Hæmatemesis and melæna are so common that fatalities represent a considerable number of lives, and it is no credit to modern medicine that these are still lost from a cause so clearly understood and—in theory—so easily remedied as hæmorrhage from the stomach or duodenum.

The best use of the three methods mentioned above (medical treatment, transfusion, surgical treatment) is clearly to be found only by experience, for none is infallible, and each has its dangers. Bare statistics are an unreliable substitute for experience. On the other hand few observers, if any, have had adequate experience of all three methods, and if they have none has published an appraisal of them that has won widespread assent. The problem can best be studied, then, by collating the experience of a number of observers using these methods. This I have attempted to do, using the records of the London Hospital, which are in most cases sufficiently full for the course and the severity of the cases to be fairly accurately judged. The records chosen were examined from the point of view of estimating the value of medical treatment, transfusion, and surgical treatment, in dealing with uncomplicated urgent bleeding of the stomach and duodenum.

CASE RECORDS

The records of 262 cases have been examined, belonging to the years 1929–33 inclusive. These comprise:—

(a) All cases admitted to hospital *on account of* recent hæmatemesis or melæna, with the exception of those in which the clinical diagnosis of cirrhosis of the liver was unequivocal. "Recent" means occurring within 14 days before admission; all cases were admitted because they bled, and would not have been admitted when they were, had they not bled.

(b) All cases manifesting hæmatemesis or melæna of significant amount while in hospital, following admission on other grounds, excluding, however, cases of post-operative bleeding. By "significant amount" is meant several ounces or more.

From these 262 cases 7 have been discarded, all of them fatal ones, on the ground that in 4 of them serious complicating disease was present in organs other than stomach or duodenum and largely contributed to death, and that in 3 cases of bleeding ulcer death occurred from perforation.

Of the remaining 255 cases, 27 died, directly or indirectly from hæmorrhage, giving a mortality figure for what it is worth of 11 per cent. Of the whole series of cases, many suffered relatively small loss of blood, were never in danger of their lives, and never caused anxiety to those in charge of them. They were treated medically, and for the purpose of this inquiry must be set on one side. The remainder are the grave cases, in whom the bleeding constituted a threat to life, and these have been retained. They comprise (a) the 27 fatal cases, (b) 15 cases in which bleeding had reduced the red cells to 2,000,000 or less, or the hæmoglobin (Dare) to 20 per cent. or less, (c) 21 cases in which blood counts were lacking, but in which a similar grave degree of blood loss was indicated by clinical condition, recurring hæmatemesis, or rising pulse-rate.

They are discussed in three groups according to their treatment.

CASES TREATED MEDICALLY

There were 31 cases, with 17 deaths. The medical treatment consisted fundamentally in complete rest in bed, morphia, and by mouth either nothing at all or minimal quantities of water or ice. Some patients also received adrenaline or calcium lactate by mouth, saline solution rectally, or hæmoplastin subcutaneously.

A. *Patients who recovered* (14).—Ages: 22 to 63, average 41. Source of bleeding: chronic ulcers were proved by radiography or subsequent operation in 7 cases, 4 gastric, 2 duodenal, and 1 jejunal; acute ulceration or erosion was diagnosed in the remainder. In 6 cases hæmatemesis recurred once or oftener during the first few days in hospital; the remainder probably ceased to bleed on admission or shortly after.

B. *Patients who died* (17).—Among these is included an infant of two days which bled to death from a duodenal erosion without evidence of sepsis. The following observations concern the other 16 cases. Ages: 23 to 74, average 51. Source of bleeding: ulcers with macroscopic perforation of arteries in their bases were found post mortem in 8 cases (6 gastric and 2 duodenal), and carcinoma of the stomach was found in 3; post-mortem examination was disallowed in the remaining 5, 2 of whom (women aged 23, 25) were thought to have acute gastric ulcers, while the remainder probably had chronic ulcers. One patient died four hours after admission to hospital, 2 about 24 hours after admission, the others after longer periods. In 6 at least there was clear evidence of recurrent bleeding in hospital. Most of them died directly of exsanguination. A few showed respiratory infections (bronchitis or broncho-pneumonia) developing after the initial bleeding, and one woman of 74 had thrombosed pelvic veins and pulmonary infarcts; these were contributory causes of death, but were themselves presumably secondary to the hæmorrhage. If the woman of 74 be excluded on account of her age, together with the 3 malignant cases, there remain 12 patients who died of gastric or duodenal hæmorrhage, under medical treatment; these constitute about one-third of the grave cases so treated, and they are deaths which should not be regarded complacently.

CASES TREATED MEDICALLY WITH THE ADDITION OF BLOOD TRANSFUSION

In this group there were 11 cases, with 3 deaths. The ages were from 15 to 64 (average 41). The sources of bleeding (judged usually from clinical evidence or subsequent X ray examination) were: chronic gastric ulcer in 3 cases, chronic duodenal ulcer in 4, chronic jejunal ulcer in 1, acute ulceration in 2, and carcinoma of the stomach in 1 (non-fatal).

The following are three examples of recovery following transfusion:—

CASE A.—Female, aged 64. History of hæmatemesis at the age of 23, but no subsequent dyspepsia. She vomited blood 10 times during the 4 days preceding admission, and was admitted extremely pale and collapsed, with an almost imperceptible pulse, rate 130. She was given morphia subcutaneously and ice to suck; 3 hours after admission she received a transfusion of 350 c.cm. citrated blood. The pulse-rate fell steadily to 80 in 24 hours, no further hæmatemesis occurred, a modified Lenhartz diet with alkalis was begun on the fourth day, and she made a good recovery. Subsequent X ray examination showed evidence of ulceration on the posterior wall of the stomach, and what appeared to be an old spontaneous gastro-jejunal fistula.

CASE B.—Male, aged 26, had suffered for years from attacks of abdominal pain after food. For 3 weeks before admission he had pain every day. On the day of admission he vomited half a pint of blood before being sent to hospital, and had 4 further hæmatemeses in hospital. He was pale with a pulse-rate varying between 86 and 116, red cells 2,000,000, hæmoglobin (Dare) 18 per cent. A transfusion of 360 c.cm. was given, and a modified Lenhartz diet with alkalis was begun. Hæmatemesis recurred on the day after admission and again on the fourth day, causing the pulse to rise from 102 to 134. A second transfusion was then given, after which recovery proceeded slowly but steadily, notwithstanding a further small hæmatemesis on the sixth day. Subsequent X ray examination showed an irregularity high on the lesser curve, interpreted as a healing ulcer.

CASE C.—Female, aged 58, had suffered from attacks of abdominal pain for 13 years and had once been operated on. For a week before admission she had been pale and felt giddy, and passed tarry stools. On admission her pulse-rate was 106–112, red cells 2,600,000, hæmoglobin 38 per cent. She was treated on the usual medical lines, but on the seventh day became extremely weak and ill, with temperature 100°, pulse 130. Melæna continued, her condition showed little change for the next 5 days, and the pulse-rate remained about 120–124. A large transfusion (900 c.cm.) was then given. Next day the pulse was down to 100–108, the melæna soon ceased, and recovery proceeded. Subsequent X ray examination showed a gastro-jejunostomy and duodenal deformity. The immediate result of this large transfusion was to raise the blood pressure from 115/65 to 125/75 mm. Hg; an hour later it had fallen again to 110/70 mm. Hg.

The details of the three cases in which death followed transfusion are these:—

CASE D.—Male, aged 51, had had periodic dyspepsia for 4 years. An attack, with epigastric pain after food, began 2 weeks before admission, melæna occurred 2 days before admission, and on the day of admission he vomited blood and fainted. He was admitted pale and somewhat collapsed, with a pulse-rate of 100, red cells 3,000,000, and hæmoglobin 30. He was given morphia, and nothing at all by mouth. Hæmatemesis (37 oz. in all) occurred 3 times in the first 24 hours, but not subsequently. The temperature rose in the first 3 days gradually to 103°, and the pulse record fluctuated, sometimes rising to 150. Subcutaneous saline was given. He then became mentally deranged and restless. On the fourth day he received a transfusion of 500 c.cm. of blood, but without showing any improvement. Morphia failed to control his semi-delirious condition, and on the sixth day, with pulse rising to 160, temperature 102·5°, and no increase in respiration-rate, he died. Post-mortem examination was not allowed, but the cause of death was no doubt continued bleeding. The anæmia precipitated the mental condition, and the resulting restlessness probably helped to maintain the bleeding.

CASE E.—Male, aged 51, was admitted to hospital for investigation, complaining of upper abdominal pain and vomiting for 3 weeks. While in hospital he suddenly became weak and pale; next day he vomited blood, his pulse rose to 122, and blood examination showed 1,300,000 red cells and 20 per cent. hæmoglobin. There was little change for 2 days, and he was then given a transfusion of 350 c.cm. The following day he developed œdema of the lungs, his temperature rose to 106°, and he died. Post mortem a chronic duodenal ulcer was found with an eroded artery in its base; the lungs were œdematous. Death appears to have been caused by acute heart failure rather than by anæmia; this may have been an abnormal reaction to the transfusion.

CASE F.—Male, aged 30, had undergone a gastro-jejunostomy for duodenal ulcer 7 years previously, and had had pain and melæna on two subsequent occasions. He vomited blood on two successive days, and was then admitted pale and collapsed, with a pulse-rate of 110. He was treated medically. A rise in pulse-rate to 150 indicated further bleeding on the day after admission, but it fell again to 80–90, and on the fifth day he appeared to be doing well (hæmoglobin 39 per cent.). On the sixth day he collapsed and his pulse rose steadily to 125. His condition was then extremely grave, and the physician in charge described him as moribund. A transfusion of 600 c.cm. was given. The steady rise in pulse-rate continued, and he died 6 hours later. Post mortem a chronic jejunal ulcer was found with an eroded artery in its base.

CASES TREATED SURGICALLY

There were 21 cases, with 7 deaths. The ages ranged from 24 to 62 (average 45). In all of them operation was undertaken with the object of stopping bleeding. The details of these cases are shown in the accompanying Table. The patients, many of whom had been referred by physicians, were all gravely ill from loss of blood, with the exception of the first two, in whom the bleeding was apparently somewhat less severe and transfusion was not given.

GROUP III.—CASES TREATED SURGICALLY

No.	Sex and age.	Operative procedure.	Result.
1	F. 59	G.U. embedded. Gast.-jej.	Recovery.
2	M. 45	G.U. found. Gast.-jej.	,,
3	M. 46	G.U. excised. Trans.	,,
4	M. 53	G.U. found. Bleeding artery ligatured. Trans.	,,
5	M. 47	G.U. found. Spouting arteries ligatured. Trans.	,,
6	M. 53	G.U. excised. Trans.	,,
7	M. 36	G.U. found. Coronary arteries ligatured. Trans.	,,
8	M. 29	Bleeding area in stomach close to a gast.-jej. stoma found and embedded. Trans.	,,
9	M. 41	D.U. embedded. Trans.	,,
10	M. 54	D.U. found, pylorus occluded. Gast.-jej. Trans.	,,
11	M. 41	D.U. embedded. Gast.-jej. Trans.	,,
12	M. 33	D.U. embedded. Gast.-jej. Trans.	,,
13	M. 53	No ulcer found. ? Cirrhosis of liver. Trans.	,,
14	M. 51	No ulcer found. Trans.	,,
15	M. 41	G.U. excised. Trans.	Death 2 days later. No P.M.
16	M. 43	G.U. excised. Trans.	Death 6 days later from [illegible]
17	M. 57	G.U. embedded. Gast.-jej. Trans.	[illegible] later. [illegible] In- [illegible] P.M.
18	M. 47	Gastrotomy. G.U. not found. Trans.	[illegible] from hæmorrhage and broncho-pneumonia. P.M.: eroded arteries in a high G.U.
19	M. 24	D.U. embedded. Gast.-jej. Trans.	Collapse and death immediately after operation.
20	M. 62	Anterior D.U. embedded. Gast.-jej. Trans.	Death 2 days later. P.M.: eroded arteries in base of a *posterior* D.U.
21	M. 32	D.U. embedded. Gast.-jej. Trans.	Death from hæmorrhage 5 days later, after 2 further transfusions. P.M.: eroded artery in base of D.U.

G.U. = gastric ulcer; D.U. = duodenal ulcer; P.M. = post-mortem examination: Gast.-jej. = gastro-jejunostomy; Trans. = transfusion.

DISCUSSION

For the reasons mentioned in the introduction no valid statistical conclusions can be drawn from these case- and mortality-records. They do, however, broaden the outlook of anyone who has had some experience of similar cases. The attempted separation into less severe cases and grave cases throws into relief the fact that a large proportion of the latter (27 out of 63) died. Though the line of separation is not a hard-and-fast one, yet it is nearly always possible to say clinically whether a given case is grave or not. It is therefore well to know that 3 out of every 7 grave cases are likely to be fatal. This is obscured by the common method of expressing the mortality-rate as a percentage of all cases. Whether the figure, 3 out of 7, obtained from this series holds exactly for other series does not affect the argument. Since this series has a general mortality-rate of 11 per cent., it is probably a fairly typical series and justifies the inference that something between one-fourth and one-half of grave cases of gastric and duodenal bleeding end fatally.

There is no means of predicting with any accuracy which grave cases will die. Under purely medical treatment some go apparently very near to death and then recover; others die unexpectedly, or develop unforeseen respiratory or mental complications which turn the balance against them. Patients with a dyspeptic history suggesting chronic ulcer, and patients who have not had dyspepsia, as well as malignant cases, are found both among the recoveries and among the deaths. Any attempt therefore at further subdivision of grave cases with a view to individual prognosis seems useless.

It remains simply to review methods of treatment and to attempt to assess them empirically. In this series the mortality was heaviest among the cases treated medically; this remains true when the malignant cases and those at the extremes of age are excluded, and it definitely lays the conservative teaching of medical treatment in *all* circumstances open to criticism. The results of a surgical attempt to deal directly with the bleeding point, in a group of cases of similar severity, appear slightly better; they show at least that, in expert hands, operation on these exsanguinated patients is not necessarily a sentence of death. The middle group of cases, treated medically with the addition of one or more blood transfusions, deserves closer consideration. It showed—for what it may be worth—a lower mortality than the other two groups; and of its three fatal cases, one was already mentally deranged and another was moribund when the transfusion was given. Eight cases, however, were transfused while still bleeding, or shortly after the cessation of bleeding, and they recovered. This sets the evidence of experience against the theoretical view that transfusion, by raising the blood pressure, will merely increase the loss of blood from the bleeding vessel or vessels, and in that respect is in line with the experience of those who treated secondary hæmorrhage in war wounds by transfusion.

From a review of the whole series of cases studied in this paper the following recommendations emerge for the management of gastric and duodenal bleeding (hæmatemesis and gross melæna):—

1. A distinction should be made, clinically, between grave cases and less severe ones. Recurrent bleeding is often but not always grave. Cases in which the red cells fall below 2,000,000 or the hæmoglobin below 40 per cent. (on a scale on which the normal is 100 per cent.) will usually be grave. The distinction is to be made, however, on consideration of the whole clinical picture.

2. The less severe cases should be treated on the accepted medical lines.

3. The grave cases should be treated medically, in bed, with sufficient morphia to ensure complete rest; and a transfusion of about 500 c.cm. of blood should be given, without moving the patient from his bed, after careful cross-grouping.

4. If further bleeding is indicated by subsequent hæmatemesis or rising pulse-rate, the transfusion should be repeated once or twice within the next 24 to 48 hours, or when necessary.

5. If bleeding still continues and the patient's condition deteriorates, operation should be promptly undertaken, along with a further transfusion. The operation should probably be restricted to the minimum procedure necessary to find and secure the bleeding point.

These recommendations are substantially the same as those given by Hurst in his book on "Gastric and

Duodenal Ulcer" in 1929. Bastedo in America and Tzanck in France agree in advocating transfusion in addition to medical treatment for grave cases, and in reserving surgery for those few cases in which the bleeding continues in spite of repeated transfusion. This course does not appear to have been widely practised in this country; it was not considered by any of the four opening speakers in a recent discussion on the treatment of hæmatemesis in the sections of medicine and surgery of the Royal Society of Medicine. This paper is a plea for its more extended trial.

I am indebted to the physicians and surgeons of the London Hospital for their permission to use the records of their cases.

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CARCINOMA OF THE RECTUM *

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CARCINOMA of the rectum forms an important part of the carcinomata which infest the intestinal tract. Of the different portions of that tract cancer of the oral cavity is one-third, that part of the tract extending from the œsophagus to the rectum produces less than a third, and the small remaining portion of the bowel makes up for more than a third.

Men and women are affected in equal numbers. The age-incidence is curious as it attacks people from puberty to old age, but there is this difference—in cancer of the rectum there are more people affected in the teens than in cancer of any other part of the body. There are 11 per cent. under 30, and 4 per cent. under 20 years of age. Between 50 and 60 are the commonest ages.

Pathologically it is very simple; it is an adenocarcinoma, starting in the [illegible]ical cells of Leiberkuhun's glands. The c[illegible]tion to this is a squamous-celled carcinoma [illegible] starts at the anal margin and is analogous to carcinoma of the lip. From here it may spread to the rectum, but I am going to disregard this form. The start of cancer must presumably be a small ulcer or a warty papilloma; in many cases we see a well-established cancer and close by a wart still in the innocent stage. High up in the rectosigmoidal region it tends to spread round the bowel so as to form what is called a string stricture. Lower down, in the ampulla of the rectum, it usually starts in the posterior wall, while near the anal canal it tends to start in the anterior wall.

There are three varieties or forms of growth, though microscopically they are all the same. They are:—

1. The papilloma or cauliflower-like mass where growth is pronounced and ulceration at a minimum. Here it forms a prominent mass in the bowel, spreads superficially and does not contract the walls—in fact, it may balloon the bowel considerably. I have seen a mass in the rectum considerably larger than a shut fist. It only affects the bowel wall superficially for a considerable time, and is therefore the least malignant form; though it may give rise to a considerable amount of obstruction by its size alone, the glands are often only enlarged by sepsis.

2. The adenoid or common form is the opposite, as here growth is at its minimum and destruction at its maximum. A shallow ulcerated area with hard edges is the result. This spreads round the bowel, rapidly infiltrating the muscular coat, and is therefore highly malignant affecting both the glands and the liver. It stenoses and obstructs the gut rapidly.

3. The colloid form is rare and is really a degeneration of the other two types.

METHOD OF SPREAD

Growths of the rectum tend to spread transversely round the bowel across the lumen, superficially in the mucous membrane; the penetration of the muscular coat is slow. Once it has penetrated the muscular coat the matter is more serious as it gains the perirectal space. This is a considerable and roomy space filled with fat which allows the bowel to expand and fill with its contents and then to collapse as its contents are voided; a certain pump-like action is therefore present which tends to spread carcinomatous cells. Hence the fascia propria or lining membrane of the pelvis becomes infected and, lastly, the neighbouring organs—namely, the vagina, uterus, prostate, bladder, and the sacrum. The veins of the bowel are important, as it is by this means that the secondary growths reach the liver. Our old teaching was that sarcoma was spread by the blood stream and carcinoma by the lymph stream. We now know that carcinoma spreads by both routes very easily, the fact of the matter being that the delicate cells of carcinoma are destroyed, being filtered out of the blood stream by the lungs, and many years ago observations were made of the difficulty these cells had in growing in the lungs when secondarily deposited there. Carcinoma cells, however, grow and flourish very readily in the liver when carried there, hence it is that the early secondary deposits are often found in the liver even before any glands can be felt affected. This very important point in treatment and prognosis will be referred to later.

The lymphatics in the bowel wall drain into the subperitoneal lymphatics where the peritoneum is present, and in other situations into the lymphatics of the perirectal fat directly. From here the lymph drains into the lymphatics which lie along the superior hæmorrhoidal vessels—the rectal glands of Gerota. From here it passes mainly up the mesosigmoid, along the inferior mesenteric vessels to the bifurcation of the left common iliac vessels, and so to the aortic glands.

Some lymph may pass downwards to the inferior hæmorrhoidal vessels, through Alcock's canal to the internal iliac glands whence it joins those mentioned above. Or the lymph may pass out with the levator ani muscles again to the internal iliac glands.

SYMPTOMS

Unfortunately cancer of the rectum in its early stages is as silent a disease here as elsewhere, and may quite well exist from six to twelve months without giving rise to any noteworthy symptoms. The earliest symptom, if indeed it can be called such, is for the bowels of a person of regular habits to become slightly constipated. This is due to inertia of the sigmoid and some interference with the normal peristaltic action. This, however, is hardly likely to create much alarm or send the person to seek medical advice. This constipation may alternate with mild diarrhœa, but this again is not

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* A clinical lecture given at St. Mary's Hospital Post-Graduate Course.

alarming if the person is trying to regulate his bowels with unaccustomed purgatives.

The symptom which should attract the attention of the medical man and at once rivet his attention is the history of what the patient terms a slight diarrhœa which lasts three weeks or a month. Little is passed at a time, there is no straining but perhaps some mucus. The bowels act after meals or after hot drinks, not more than three or at the most four times a day. Later a little blood may be noted.

In the adenoid form stenosis occurs and the diarrhœa is equally well marked as only fluids can pass the stricture, but here there is little mucus and seldom any blood. If the growth is low down in the bowel there may be discomfort, and the patient thinks he has piles as there is a feeling of incomplete relief after motions. In these lowly situated growths the history is so often the same that I will recount a case.

The person, as I have already stated, thinks he has piles; he talks to his friends, one of them is sure to have had piles, and confirms his views. Often the friend tells him what to do and prescribes the remedies that were beneficial in his own case. As this does little good he eventually meets his doctor and says casually, "Oh, Dr. A., I have been suffering lately from piles—nothing much you know, but they are uncomfortable." It is in the next few minutes that his fate is decided. If Dr. A. is a careful man he says, "Well, come and see me to-morrow and I will examine you," and the next day he puts his finger in the rectum, the growth will be felt, the diagnosis made, and he may be saved. But if Dr. A. is haphazard and believes what his patient says and does not examine him, the golden opportunity is lost and the patient is surely doomed. Remember that you must always put your finger in the patient's rectum the first time you see him about his piles, for if you do not you will never do it later; you will think you have done so and the opportunity for early diagnosis is lost. Later, when the treatment you have advised does not act, you will change it or tell him to persevere; so time goes on and the condition slowly gets worse, until he is thoroughly fed up with it and goes on advice—probably of a friend—to see Dr. B. Now, curiously enough, however careless you may be of your own patients you are never careless in the case of patients coming from the opposition, and Dr. B. puts his finger in the rectum and diagnosis is made. The wife or the friends are told the truth, the patient suspects—he knows well enough that Dr. A. never examined him—and I leave it to your imagination as to what is said in the provincial town about Dr. A. The other and more happy variation of the story is for Dr. A. at last to examine the rectum after a delay of perhaps six months. In my ward at the moment are patients who can give both these histories.

As time goes on, in any form of the disease ulceration may occur or become more marked and with this pain will appear, a dull aching in the region, mucus and blood will become more marked, and pus will be seen. In the later stages more depressing symptoms appear, the rectal wall becomes penetrated, and there is spread to the adjacent organs. Pain is noted down the back of the thighs from involvement of the sacral nerves. Colic and distension accompany constipation and diarrhœa. The chronic obstruction may at any time become an acute affair. Loss of weight is now a feature of the disease. The prostate may be involved, upsetting the function of the bladder. Fistulæ may form between the rectum, bladder, or vagina. Lastly, œdema of the legs appears, jaundice ensues, and there is general carcinomatosis and death.

DIAGNOSIS

When the various conditions which exist in the rectum are considered there appears very little which can simulate a really established cancer. When, however, we look for so-called classical symptoms and find them, we at the same time find a doomed case. This being so it only remains to mention the conditions which might be mistaken for the early stages.

Intussusception of a simple papillomatous growth may take place, but the tumour can be felt floating in the bowel. The lumen is in the centre of the tumour, and the finger can be passed round it. There is often a lump felt in the left iliac fossa and there may be signs of chronic obstruction. A villous papilloma is sometimes felt as a soft growth which can be moved about with the finger; it secretes a watery fluid which may cause frequent evacuations.

An adenoma may be single or multiple; it is firmer than the villous tumour, lobulated but devoid of induration. It may be pedunculated or sessile. It is as well to bear in mind that these papillomata or warts are liable to become carcinomatous here as elsewhere. When multiple, it is curious to find that more than one may be taking on malignant characteristics. Multiple cancers of the rectum, which are not uncommon, start in these warts if they are not implantation cancers from a growth high up. I show you here a specimen where there are four separate carcinomatous ulcers and some innocent warts.

An adenomyoma starting in the cervix or vagina may form a prominence into the rectum. Such cases naturally are rare and not easily recognised. They are always defined and very hard, and the mucous membrane moves freely over them. Some cases of diverticulitis may simulate early carcinoma, but X ray examination will distinguish them at once.

Diagnosis is made from the history of the case, the examination of the abdomen, the examination of the stools for blood and mucus, and the digital examination of the rectum. Added to these there is the special examination of the rectum with the sigmoidoscope; often an anæsthetic may be required if this is to be satisfactory. Lastly, the barium enema combined with actually seeing the opaque fluid run into the bowel under the X rays, when a better idea is obtained than from the photograph, of the extent of the growth and the mobility of the bowel which can be seen to move or remain fixed when manipulated by the hand on the abdominal wall.

In performing the digital examination in the female it is better to make her lie upon her right side, but in the male there is nothing to compare with the knee-elbow position. The mobility of the growth should be made out and the extent, if possible, of the constriction—if the finger can be inserted through it—the depth of the ulceration, and the condition of the edges. It may quite well be that a growth which started well out of reach of the finger may descend, partly by growth and partly by intussusception to within easy reach of the finger, so that an examination may previously have been made by the doctor and nothing discovered, then at a later date the consultant may easily feel it.

TREATMENT

Cancer of the rectum is only partly accessible, therefore the diagnosis is seldom made at an early date and inoperable cases are common, but how common they are is perhaps not realised. It is safe to say that 75 per cent. of the cases are inoperable when diagnosed. Even in private practice 50 per cent. are inoperable. In the figures recently published for one of the London hospitals, out of 123 cases only 29 were operated on, and of these 9 died from the operation.

The chief general points which militate against operation are the age of the patient, for the older they are the worse the result. There are few cases over the age of 65 who are fit to undergo the radical operation. Stout people bear the operation badly. Any general condition such as a bad heart, arteriosclerosis, high blood pressure, albuminuria, diabetes absolutely contra-indicates radical measures. Lastly, we have the findings at the colostomy operation which so often decide one against further surgical procedure.

Of the type of operation the old form of Kraske is gone. We now have the abdomino-perineal operation or one of its modifications such as Coffey's operation, or the perineal operation which is a modification of Kraske's. Whatever operation is adopted a preliminary colostomy should be insisted upon. The health of the patient improves immensely after a colostomy, the bowel is washed free, and the septic absorption is diminished, colic and pains cease, and the patient is at ease. Therefore it is the best preliminary for the next operation if one is to follow. The chief advantage, however, is the information gained in performing the operation, for we do far more than establish a colostomy. What we do is of paramount importance both to us and to the patient, and too often the important parts of this procedure are overlooked, and only a colostomy is performed. The incision must be large enough to enable the hand and arm to enter the abdominal cavity. The hand passes to the pelvis and the extent, mobility of the growth, and spread of the disease is determined. The rectal and abdominal glands are sought for and felt, the peritoneum round about is searched for suspicious plaques, and, lastly, the dome and under-surface of both lobes of the liver are investigated. If there is already a secondary growth in the liver, further operation is out of the question. This is the part of the operation which too often is overlooked, it is not mentioned, as far as I know, in any book, but its importance must be clear to you all, for what can be the use of submitting a patient to a risky operation like the radical removal of the growth when his death warrant is already signed and sealed in his liver?

Lastly, there is the advantage that the rapidity of growth diminishes after colostomy is performed. The rapidity of tumour growth depends upon its vascularity, the irritation of the fæces passing over the ulcerated surface or squeezing through the stricture must increase this vascularity. As a result of colostomy the bowel remains empty, disused, and relatively anæmic; growth in consequence is proportionately slower.

Surgeons sometimes have cases sent to them for operation upon whom a colostomy has already been done. At this operation no attempt perhaps has been made to ascertain the operability or the presence of secondary growths, and in any case it may be impossible to communicate the knowledge to the second surgeon. If we operate we do so in the dark without the knowledge so essential to success, and we run the risk of discovering that the case is inoperable half-way through the operation. If the colostomy has been done to relieve an acute obstruction it may have been impossible to find out these points, owing to distension or the critical state of the patient. My rule in such cases is to open the peritoneal cavity and ascertain the state of affairs; otherwise harm may be done in stirring up an inoperable case or performing a useless operation upon a person who already has secondary masses in the liver.

Should the case be unsuitable for operation th patient needs to be taught the right way to li after colostomy is established. The bowels act b habit, and habit can be taught to the sigmoid colo just as it can to the bowel below it. If the patie wants comfort he must take trouble, and if he wi take trouble with his colostomy opening it is th rarest thing for him to be let down. Eac finds out what suits him best and the more troub he takes with the details the greater is his comfor I have a patient at the present moment who attende Ascot last year and also the garden party at Bucking ham Palace, and I do not think any of her friend even suspect her condition. The patient with colostomy will tell you he has no inconvenienc except when washing himself. A tube is passed an the large bowel washed empty and the fluid draw off; a stomach-tube with lateral holes should b used. With practice it can be passed round to th cæcum; it is important to draw off all the fluid s that there will be no leakage later. For the wash-ou there is nothing so useful as the rubber kidney tray made by Down Bros. Ltd. at my suggestion, whic takes the shape of the body. A piece of gauze smeare with vaseline is applied over the colostomy opening and an abdominal belt with a flat piece of thic rubber is worn over it. This should prevent al leakage until the next wash-out is given. Colostom belts with cups or receptacles should be avoided.

A diet is chosen which does not give rise to wind but flatus even only rarely escapes and is absorbe again. The lower portion of the bowel should b washed out with a mild antiseptic, such as wea sanitas, as required; some do it twice a week depending on how much secretion there is. Needless to say, it should be freed from fæces as soon as possible.

Now can anything be done to check the growth of the tumour? I think it can. A month to six weeks after the patient goes home he reports to me again. I pass down into the lower portion of the bowel through the colostomy opening a specially made narrow sigmoidoscope tube and examine the growth and insert a well-protected tube of radium, containing about 30 mg. of radium, into the stricture. This is left in place for four to five hours. Next day the tube is placed in the stricture from the anal orifice for the same length of time. The patient is then given one free day and the same thing is repeated. In this way a dose of about 500 mg. hours of radiation is given directly to the growth. This is repeated at intervals of about a month for three times, and at the end of that time the growth in many cases has almost disappeared, or at all events is sterilised and either does not grow at all or grows very slowly. I have several cases in which this has been carried out, and now no growth is perceptible. This, of course, has no effect upon secondary growths in the liver or intestines and holds out no hope of cure, but it prevents the spread to the neighbouring organs and the formation of fistulæ which render the last weeks of life so trying to these patients.

The cause of death in these cases is from secondary masses in the liver and elsewhere; this as a rule comes rapidly in the end, so that the patient suffers little.

AYRSHIRE HOSPITAL SERVICES.—The Ayrshire county council has adopted a scheme for the centralisation of the hospital services of the county under which a central hospital will be built at Kilwinning at an estimated cost of £210,000.

THROMBOPENIC HÆMORRHAGIC PURPURA

DUE TO IDIOSYNCRASY TOWARDS THE HYPNOTIC SEDORMID

ALLERGOTOXIC EFFECT

BY F. E. LOEWY, M.D. Vienna, M.R.C.P. Lond.

"Werlhof's disease"—the severest form of thrombopenic hæmorrhagic purpura—presents a well-defined clinical picture: a hæmorrhagic diathesis characterised by markedly prolonged bleeding time and tendency to petechial hæmorrhage. Slight injury to skin or mucous membranes by knocking, pricking, or pinching causes extravasations of blood and, after compression of the arm for about five minutes by a tourniquet (sphygmomanometer-cuff), numerous petechiæ appear in the area of passive congestion. The essential feature is the practical absence or severe reduction of blood-platelets.

This thrombopenic hæmorrhagic diathesis occurs regularly when the bone-marrow with its megacaryocytes has been extensively damaged by proliferating lymphadenoid (leukæmia) or neoplastic tissue, by excessive irradiation (radium, X rays), or by prolonged influence of certain poisons (benzol). Not infrequently the cause remains unknown—"essential thrombopenia." The spleen has been blamed in these cases, but the beneficial effect of splenectomy proves nothing, as no characteristic abnormality has been found in the excised organ and splenectomy regularly causes a rapid and sustained increase of platelets in healthy persons.

I have been able to prove that a typical case of Werlhof's disease and two milder cases of thrombopenic purpura were due to prolonged administration of the new hypnotic Sedormid (allylisopropyl-acetylurea) to hypersensitive patients. In the first case, after recovery, thrombopenic purpura was produced at will by giving ½–1 tablet of the drug (tablets of grs. 4 each). The elucidation of these cases was by no means simple, as sedormid has up to now been considered perfectly harmless and my patients had taken the drug repeatedly for some time without apparent ill-results.

THE CASES

CASE 1.—The first patient was a gentleman of 61 years, very highly strung and neurasthenic but never seriously ill. For the last six to ten years he had complained of general lassitude, had suffered frequently from indigestion with flatulence (irritable colon), and occasionally from insomnia. His blood pressure was low (118/85). The liver was slightly enlarged and hard, but not tender; the spleen was never palpable. At an alpine spa he was suddenly taken ill on Dec. 31st, 1930, with vomiting, flatulence, and slight rise of temperature. The diagnosis was at first coronary thrombosis, later influenza. Recovery was very slow, and delayed by general weakness, insomnia, constipation, and slight rise of temperature on and off for several months. He felt better during the summer and visited several spas. In September again he suffered from general weakness and had pain in both arms. A few pale purpuric spots were noted on the trunk on Sept. 10th. A week later marked purpura appeared on the right arm, which had been massaged. The extraction of a tooth was followed by severe hæmorrhage and rapid deterioration of the general condition. On Sept. 23rd there was purpura on both legs with large bruises over the right thigh; on Sept. 28th melæna; and on Sept. 30th hæmaturia.

On Oct. 5th I found the patient seriously ill. The whole body was covered with petechiæ and bruises; he passed tarry fæces and urine thick with blood. Bruises were easily produced anywhere by slight tapping. Bleeding time was prolonged over many hours. The blood count (Dr. H. Letheby Tidy) showed: hæmoglobin, 58 per cent.; red cells, 2,700,000; colour-index, 1; white cells, 9600 (polymorphonuclears 74 per cent., small lymphocytes 15 per cent., large mononuclears 3 per cent., eosinophils 4 per cent., myelocytes 4 per cent.); platelets, 22,000. In the evening hardly any platelets were seen in one smear. The condition seemed extremely dangerous and splenectomy was considered. A transfusion of 600 c.cm. of citrated blood was given, with immediate marked improvement of the bleeding tendency. He had a severe rigor. On Oct. 6th the tourniquet test was negative, and there were no more new spots. On Oct. 7th his hæmoglobin was 52 per cent.; red cells, 2,350,000; white cells, 6400; platelets, 120,000. On Oct. 8th his urine was clear, the fæces lightly coloured, and the platelets over 120,000; the tourniquet test was negative. On Oct. 9th the platelet count suddenly dropped again to 55,000; bleeding time was prolonged, and the tourniquet test positive but there was no spontaneous purpura. Hæmoglobin was 54 per cent.; red cells, 2,650,000; white cells only 3600 (polymorphonuclears 86 per cent., small lymphocytes 8 per cent., large mononuclears 3 per cent., and eosinophils 3 per cent.). The slight thrombopenia continued for the next two days without marked change in the general condition.

Lord Dawson, who had seen the patient in consultation, had suspected hypnotics as the cause of the illness but the patient had firmly resisted any attempt at withdrawal. After the transfusion he received grs. 7½ of Medinal nightly. On recovering strength he became more restless and insisted on receiving, in addition to the medinal, his favourite hypnotic sedormid, which he had been taking frequently in doses of 1–2 tablets since December, 1930, and especially regularly for several weeks preceding the transfusion. Two tablets of sedormid had been given during the night on Oct. 8th and 9th, and one more tablet on Oct. 10th. The recurrence of thrombopenia thus coincided with the resumption of sedormid. After Oct. 10th I allowed only bromides in addition to the usual medinal. From Oct. 12th onwards the platelet count rose again rapidly. On Oct. 16th the hæmoglobin was 66 per cent.; the red cells, 3,500,000; white cells, 9600; platelets, 360,000. On Oct. 23rd I again gave one tablet of sedormid to test the effect. Promptly the next morning purpuric spots appeared on both legs; the bleeding time was slightly prolonged and the tourniquet test positive, and there was slight hæmaturia. Only a few stray platelets were visible in one smear. The next day no further spots appeared, the tourniquet test was negative, and the platelet count rose rapidly and was normal again within a week.

I decided to make a final test on Nov. 4th. The platelets numbered then 502,000; red cells, 4,410,000; hæmoglobin, 87 per cent.; colour-index, 1; white cells, 12,600 (polymorphonuclears 43·5 per cent., lymphocytes 21·7 per cent., large mononuclears 7 per cent., eosinophils 27·8 per cent.). I gave half a sedormid tablet in the evening. After a good night numerous purpuric spots appeared next morning on the trunk, and especially on the right side, on which the patient had been lying. Bleeding time was prolonged over ten minutes, the tourniquet test was positive, and the temperature was normal. The platelets numbered 17,600. A blood smear showed slight leucocytosis (polymorphonuclears 46·7 per cent., lymphocytes 14 per cent., large mononuclears 9·3 per cent., eosinophils 29·3 per cent., basophils 0·7 per cent.). On Nov. 6th the platelets numbered 25,600; the tourniquet test was slightly positive. On Nov. 7th the platelets were 48,000 and the tourniquet test was negative. No more spots appeared, and on Nov. 19th the platelets numbered again 347,000. The case against sedormid was proved.

The patient is still under regular observation and has remained free from any signs of thrombopenia or hæmorrhagic diathesis. The platelets are always plentiful; there is frequently marked eosinophilia, and occasionally pruritus and complaints due to an "irritable colon." Skin tests with sedormid and the Prausnitz-Küstner test were negative.

Through the kindness of Dr. W. W. MacNaught I saw on June 1st, 1933, a second, less severe but unequivocal case of thrombopenic purpura caused by sedormid.

CASE 2.—Mrs. A, a lady of 60, had taken sedormid with good effect in doses of ½–2 tablets nightly for several weeks in the spring of 1932, after an abdominal operation. Recovery was delayed by pulmonary infarcts. For the last five and a half weeks she had again taken 1–2 tablets nightly. About one week after resuming the drug in 1933 she noticed purpuric spots, later also large bruises on different parts. Fresh crops of petechiæ appeared every few days, in spite of treatment with calcium. She had severe bruising at the site of an intramuscular injection of horse serum, and retinal hæmorrhages. The patient complained about pains in various joints and headache, but was not feeling severely ill. She was very highly strung and had been suffering for years from "nervous indigestion." I found the bleeding time markedly prolonged (over eight minutes) and the tourniquet test positive. The platelets numbered 28,000; the hæmoglobin was 78 per cent.; the red cells, 4,000,000; the colour-index, 0·9; the white cells, 6800 (polymorphonuclears 45·9 per cent., lymphocytes 40·6 per cent., large mononuclears 4·1 per cent., and eosinophils 9·4 per cent.).

Sedormid was stopped and no more petechiæ appeared. A week later the bleeding time was normal again and a blood smear showed platelets in approximately normal number and in big clusters.

CASE 3.—I was called on Dec. 22nd, 1933, to see the third patient, a married woman aged 51, who was very worried about bleeding from the gums. This had started two days before, a few hours after a sedormid tablet had been taken. There were also numerous purpuric spots on the trunk and legs, but at the time of examination the bleeding tendency was already improved. The bleeding time was normal; the tourniquet test negative; the hæmoglobin 95 per cent. The platelets numbered only 36,000 per c.mm. The patient, who was very nervy, had taken sedormid in doses of ½ to 1 tablet repeatedly during the last year and had experienced during that time several attacks of purpura, and once a small retinal hæmorrhage. Sedormid was stopped and no further hæmorrhages occurred.

PATHOGENESIS OF SEDORMID PURPURA

Sedormid is an ureid (allylisopropyl-acetyl-urea) similar in constitution and action to adalin (diaethyl-brom-acetyl-urea), and has been in use for several years as a sedative and mild hypnotic, apparently without any ill-effects. It was stated [1] in February, 1933, that no allergic disturbances had been observed after sedormid. A recent publication on thrombopenic purpura after iodine [2] reports without details the case of a woman who developed thrombopenic purpura after taking minute doses of iodine for several weeks. She recovered, but later had two relapses, each time the day after taking sedormid. She is said to have had no sedormid before (?).

The text-books contain no reference to thrombopenic purpura after hypnotics. After prolonged use of adalin,[3] itching patches and "purpura Majochi" have been seen in a few cases, but no thrombopenia. After abasin [4] (acetyl-adalin) a man of 58 years developed not only purpura Majochi and polycythæmia, but later also a mild thrombopenia. Nirvanol is a hypnotic (similar to phenobarbital) which usually produces a "toxic reaction" with rash, fever, and eosinophilia if given in small doses daily for one to three weeks. This reaction has been used in the treatment of chorea but has proved dangerous in certain cases, and in the case of a 17-year-old girl was accompanied by severe thrombopenic purpura.[5] It is interesting that the "drug rashes" caused by ureids with an open chain of carbon atoms (adalin, abasin, and now sedormid) develop insidiously without rise of temperature, while barbiturates with a closed ring of carbon atoms (medinal, luminal, nirvanol) are apt to cause acute rashes with marked general disturbance.[3]

ALLERGOTOXIC EFFECT

In dealing with harmful effects due to prolonged administration of drugs—a subject of vast and increasing importance—it is necessary to distinguish:

1. *The direct toxic effect* due to overdose or cumulation and characteristic for each specific drug.

2. *The purely allergic effect* producing affections identical with those seen in consequence of an antigen-antibody reaction in protein anaphylaxis—e.g., serum disease. The illness—e.g., anaphylactic shock, urticaria, asthma—is the same in spite of enormous differences between the causative agents and depends largely on the constitution of the patient.

3. *The allergotoxic effect.*—In many cases an overdose can be excluded and a peculiar susceptibility due to gradual sensitisation of the patient must be assumed; the illness is, however, different from purely allergic reactions and fairly characteristic for the causative drug, which probably acts indirectly through influence on the protein metabolism. Such an allergotoxic effect is responsible for most "drug idiosyncrasies": for cinchophen disease, arsphenamine diseases (dermatitis, hepatitis, thrombopenia),[6] sulfonal hæmatoporphyrinuria, and also for sedormid thrombopenia.

SUMMARY AND CONCLUSIONS

Severe loss of blood-platelets and consequent hæmorrhagic diathesis have been caused by the usual doses of sedormid in certain hypersensitive patients who had received the drug for several months previously with apparently good result.

Repeated administration of a drug may lead to an illness due to sensitisation but unlike the typical purely allergic affections and distinctive according to the chemical nature of the drug: allergotoxic effect.

The modern hypnotics and sedatives are certainly valuable but never absolutely harmless, and careful supervision is required, especially with newly introduced drugs and hypersensitive patients with irritability of the digestive tract.

Cases of "essential" thrombopenic purpura may be traced to drugs even if these have been taken already for some time with no evidence of any ill-effect (arsphenamine, sedormid). If the patient receives a blood transfusion, as Dr. H. Letheby Tidy [7] postulates for all severe cases before splenectomy, time will be gained for closer investigation and an operation perhaps frequently avoided.

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THE BRISTOL HOSPITALS.—The overdraft of Bristol General Hospital now stands at £23,575, having been increased last year by £13,000. One-third of the 1933 in-patients (5470) found it impossible to make any contribution to the cost of their treatment. There were over 37,000 out-patients. The pressure upon the X ray, massage, and electrical departments is so great that it is necessary to spend £10,000 in adapting for their use the rooms in the old out-patients' department. In an address at the Lord Mayor's Chapel, Dr. E. J. Glenny said that there are 1000 beds in the Bristol voluntary institutions, each of which costs £5 weekly.

PAPER FILMS IN RADIOGRAPHY[1]

By J. V. Sparks, B.A. Camb., M.R.C.S., D.M.R.E.

CHIEF ASSISTANT, X RAY DEPARTMENT, ST. BARTHOLOMEW'S HOSPITAL; RADIOLOGIST, CITY OF LONDON CHEST HOSPITAL

The possibility of the substitution of negative paper for the celluloid film was suggested in a paper read before the British Institute of Radiology in October, 1930, when Dr. J. F. Bromley described and showed examples, mainly in cases of fracture, demonstrating that even minute fractures of the carpal bones were readily distinguishable.

Little more was heard about the paper negative until samples began to appear from Germany about two years later, presumably owing to the fact that the paper was of inferior quality and was an innovation. For it must be realised that in fracture work the radiologist bears a great responsibility in cases where his findings are negative, and it would be a false economy to run the chance of missing a fracture through using what might be considered an inferior article. It was eighteen months ago that I started experimenting with the use of paper films in chest cases at the City of London Chest Hospital for the control of artificial pneumothorax cases.

It was soon found that the emulsion was so sensitive that fogging occurred within a few minutes with the ordinary dark room safe light, but this fault was obviated by placing the negative in the developer immediately it was removed from the cassette. At first it was thought advisable to take a celluloid and paper film of each patient so as to have an accurate comparison between the two. Subsequently, contrary to expectations, it was found that the lung detail in health and disease was so accurately comparable to that obtained on celluloid that I was able to place before the medical committee a scheme for the substitution of celluloid by paper films in certain cases, the object being economy without loss of efficiency.

At this time the English manufacturers came into the market and produced a paper film vastly superior to that supplied from abroad, and the quality of the emulsion has since improved further, and is of a very high standard at the present time. It was found that even greater attention to detail as regards penetration and exposure time was necessary as the latitude of the paper film was very small compared with that of celluloid, and errors of exposure could not be corrected by altering the subsequent development; in fact, if any error of technique was present it was not possible to correct it by subsequent intensification or reduction without spoiling the final result. A poor celluloid film is just poor, but a poor paper film is ghastly.

The paper film has been found to be definitely inferior for use in small children and for adults above the average size; neither has it proved of value for examinations after lipiodol injections where the films are purposely given a greater exposure than normally. Nor has it been found satisfactory for examinations in the oblique and lateral positions. The speed factor of the paper film with one screen shows from 40 to 50 per cent. increase in the exposure time over the celluloid film with two screens, suggesting that the emulsion on the paper film is the faster.

Paper films have been used exclusively at St. Bartholomew's Hospital during the past year for barium meal examinations, and have been found to be satisfactory for patients of normal size, when used in conjunction with a Potter-Bucky diaphragm, or Lysholm grid; they are inferior if used for stout patients or without the grid. I have found that a good paper film when viewed with strong reflected light compares favourably with the celluloid negative when viewed through daylight; it falls short of a celluloid film viewed under proper conditions, and though it will indicate the presence of tuberculous disease it might fail to show the tubercles in the lung which are essential to confirm the radiological diagnosis.

At the Victoria Park Hospital we have arranged for paper films to be taken of all cases, except those mentioned above, unless a request for celluloid is made by the physician. At the commencement of this scheme there was a greater percentage of paper films than celluloid, and now after working for 18 months by this method there are still about 40 per cent. of the chest cases taken on paper. Naturally such films are taken for economic reasons at the discretion of the physician; in a way they are a tribute to the skill of the lay technicians by whom all the radiograms are taken.

I can recommend the use of paper films in chest cases for the anterior view in patients of normal size provided that the apparatus is designed with a fine control of penetration and exposure when results can be obtained within about 10 per cent. of those obtainable with celluloid. They are in everyday use at Victoria Park Hospital—(1) as preliminary films to exclude disease, a celluloid examination being made in any case of doubt; (2) to watch the progress or retrogression of pulmonary disease; (3) in cardiac cases. They are also recommended for the control of the position of fractures where information about the state of union is not required, and for barium meal examinations. I cannot recommend their use in any department where there is no standardisation of technique, or where errors of exposure are controlled in the dark room.

These experiments have been made, primarily for economy, to enable the expenditure in the X ray department to be reduced. To give an idea how real such a reduction has been at Victoria Park Hospital, I may add that we have during the past year increased the number of X ray examinations from 3000 to 4000 without adding to the total film cost, and we hope during the ensuing year to effect an even greater saving through non-duplication. These figures are remarkable when one considers that if there is any query an additional celluloid film is taken.

I might add that the shadows on a paper film are negative shadows, comparable in density to those seen on celluloid, and that reproductions can be made from them equally satisfactorily.

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[1] Dr. Sparks submitted a series of paper radiograms which compare favourably with celluloid films of the same subject. They are open to inspection at this office.—Ed. L.

Donations and Bequests.—The late Mrs. Edith Anne Thorpe, of Eastbourne, left £3500 to Epsom College and the same sum to the Medical Charitable Society of the West Riding of Yorkshire.—By will the late Mr. Thomas Craven, J.P., D.L., of Kensington Palace-gardens, London, left £1000 to the Manchester Royal Infirmary; £500 to the Salford Royal Hospital; £500 to St. Mary's Hospital, Manchester; £500 to the Hospital for Consumption, Manchester; £500 to the Manchester Children's Hospital; £500 to the Northern Counties Hospital for Chronic and Incurable Diseases; and £500 to the Belgrave Hospital for Children.

MEDICAL SOCIETIES

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM

THE annual congress of this society took place at the house of the Royal Society of Medicine from April 12th–14th, under the presidency of Mr. M. S. MAYOU. A discussion on the

Surgical Treatment of Unusual Forms of Squint and Heterophoria

was opened by Mr. Mayou, who dealt with a selection of cases from a series of 700 operations for squint. No ophthalmic surgeon, he said, had had many cases of the rarer forms of squint, and as the results were not generally known, there was a natural hesitation to operate at all for fear of making the condition worse, as might easily happen if the operation were faulty or done at the wrong period of life. Even such a common condition as hyperphoria was seldom operated upon in this country. He used the old method of tenectomy with advancement, so that he could see what he was doing. Provided the muscles were *not* pulled upon it was practically painless; he had done tenotomies in children of 3 years, and tenectomy in children of 5, without an anæsthetic. But he did not object to operating under an anæsthetic if the patient had good vision in both eyes and possessed a sense of fusion. When the patient was not under an anæsthetic the result was controlled during the operation by the Maddox rod test, with a light set in the ceiling of the theatre. In doing either tenotomy or tenectomy he did not separate the tendons from Tenon's capsule, as it gave a firm hold for the sutures, which were then not so liable to cut out. He used Japanese fishing gut, which was soft and easy to pull through. Low degrees of hyperphoria were treated by prisms; high degrees (which were accompanied by diplopia or torticollis) by tenotomy of the superior rectus. Speaking of partial tenotomy, Mr. Mayou said that unless the tendon was completely divided there was practically no result; he always inserted a tenotomy hook to make sure this had been done. For tenectomy he used the three-stitch method. When it was desired to increase the effect of the advancement the sutures should be placed further back, through capsule and tendon. The opposing muscles should be tenotomised in every case, partly in order to increase the effect, but in any case to weaken temporarily the muscle and so obviate traction on the sutures. Complete rest to the muscles was ensured by bandaging both eyes for seven days after operation.

Diplopia occurred in association with what was apparently a concomitant convergence in late syphilitic lesions of the central nervous system. It resembled that met with in encephalitis lethargica as it was always divergent. It was due, he thought, to a lesion of the convergence centre in the brain; he had seen four such cases between 35 and 45 years of age. Cases of ocular torticollis with hyperphoria were eminently suitable for operative interference, because if the hyperphoria was corrected, stereoscopic vision resulted immediately, and the head was brought to the normal posture. Congenital defect of external recti might occur on one or both sides, and was usually associated with convergence. Some unilateral cases might be due to a birth injury. There were two groups: one associated with enophthalmos, in which the internal muscles and the check ligaments appeared to be bound down on the inner side of the orbit; the other without enophthalmos. It was important to operate on these cases early in life; if they were left until later, diplopia resulted from the operation. Of three cases operated on by tenotomy and advancement, in two the eyes were straightened but no outward movement occurred. In the other case the muscle which was being held in the forceps was felt to contract, and there was a slight return of outward movement later. In one unilateral case with extreme convergence, good movement was obtained by operation.

Dr. BERNARD CHAVASSE, in an exhaustive review of the subject, asked members to pool their experience, poor as well as good. One lesson he had learned was the extreme importance of careful diagnosis. He dealt with 29 cases of unusual forms of squint, demonstrating by means of slides the particular treatment employed. There was, he said, a good deal of similarity between cases of congenital abducens palsy and those of so-called essential alternating convergence due to a total absence of the fusion faculty. In cases in which the abducens palsy was very slight much could be done by superimposing ordinary concomitant convergence. In young children benefit followed rotation of the head away from the paretic abducens, at the same time stimulating conjugate deviation. He spoke of fusion and the stereopsis found in alternating squinters.

Mr. W. H. MCMULLEN said that in most forms of congenital paretic strabismus the best results were obtained by tenotomy or recession of the chief opponent to the affected muscle, in some cases with advancement of the weak muscle. Where the oblique muscles were concerned it was impossible to alter the position of attachment of the tendons to the globe. For paresis of the superior oblique three methods of operation merited consideration. The first was division of the inferior oblique of the same side close to its point of origin. Doyne, in 1926, reported two cases of ocular torticollis in which he had done this, with marked improvement in one, little or none in the other. Temple Smith recommended not merely division of the muscle, but excision of a portion, and he claimed excellent results in torticollis. Mr. McMullen had not attempted it, chiefly because of the impracticability of controlling the result. The second method was displacement of the insertion of the tendon of the superior rectus of the same side. In 1903 Jackson described an operation for outward and backward displacement of the insertion in order to increase the power of intorsion of the muscle, while lessening its power of superduction. Years ago Mr. McMullen did this operation on a boy who had marked torticollis, but the result did not satisfy him, though the mother expressed her pleasure at it. The third method was tenotomy and recession of the inferior rectus of the opposite side, favoured by most writers on the subject. The setting back of this tendon compensated fairly well for the weakness of the superior oblique on the other side. It was possible to combine this operation with an advancement of the superior rectus, the result of which could be controlled.

Sir RICHARD CRUISE spoke of six cases of unusual type which he had dealt with, and in which the results had lasted 20 to 30 years. One case he saw in 1910 on account of long-standing hyperphoria of high degree; as refraction was normal he did not operate, but the patient returned in 1913 begging that something might be done. Accordingly he performed tenotomy of the superior rectus and put in a retention suture. A month later there was an excellent cosmetic result, but the trouble did not end. A prism stereoscope was supplied and exercises given for fusion, as there was cyclophoria. A few days ago he had seen this patient who was practically cured and quite happy. Another case was one of divergent strabismus of 16 years' standing. There was no attempt at fusion before operation in 1918. A slight operation with fusion exercises restored binocular vision, and she had remained happy. He concluded by paying a warm tribute to the work of Claude Worth in this domain.

Mr. **Humphry Neame** reported a case of upgoing eye in adduction in a girl 4 years of age, in whom the difficulty improved almost to disappearance in a few years, so that it was hoped it would eventually go entirely without treatment beyond the correction of the error of refraction. He also spoke of the case of a girl aged 22 who had a history of squint dating from infancy. At 3 years of age an operation was done on the eye, the nature of which was not known. Last year when seen she had a right convergence of 10°, which was concomitant, and the right eye went upwards 20°; the upward deviation increased when she looked to the right. With this eye vision was restricted to finger counting at 2 ft.; the vision of the left eye was 6/6. In December he did a right tenotomy of the superior rectus, and in January a right advancement of the inferior rectus. After the second operation, instead of being 20° up in the middle position looking forward, there was 10° in the right eye, with 5° convergence. In March he did an advancement of the right inferior rectus and a recession of the internal rectus. Recent photographs showed great improvement. He had had other similar cases.

Mr. **F. A. Williamson-Noble** related a series of cases of unusual squint, among which was that of a woman aged 24, whose refraction was practically emmetropic. He decided to do a recession of the inferior rectus, putting the muscle back 2 mm. Three weeks later, when she looked straight ahead, with the Maddox rod she was practically orthophoric, and in that state she had since remained. Another case was a man aged 56 with paralytic squint, following a fracture of the base of the skull. The condition had lasted 15 years, and although the external rectus seemed to be the only paralysed muscle, such marked secondary contraction had occurred in the internal rectus that the eye was drawn in towards the canthus, and was useless for purposes of vision. Operation was not urged; an eye was painted on the back of his glass.

Dr. **George Young** (Colchester) reported a case of extreme vertical imbalance in a woman aged 44, whose complaint was of lacrymation and left frontal headaches. No organic changes were detectable in the fundi, but the left optic nerve was less developed than the right. She had considerable left hypophoria. He prescribed constant bi-focal correction, but a few months later serious discomfort was reported, with lacrymation and photophobia, and occasional diplopia while in the street. Many other measures were tried, and eventually the eye was excised, after tenotomy had failed. It was found that the diplopia was produced by the subsequent formation of fibrous bands, which frustrated the initial good result of the tenotomy. She remained greatly benefited by the enucleation.

Mr. **P. G. Doyne** agreed that slight cases of ocular torticollis were not uncommon, and for them no treatment should be precipitately attempted. But in some cases the deformity was so marked that secondary postural deformities arose, and it was necessary to do something operative. In his own hands tenotomy of the inferior oblique had been, on the whole, satisfactory. It was important that these cases should be recognised outside ophthalmic circles, so that appropriate control could be given from the beginning.

Mr. **Lewis Savin** spoke of his treatment of eight cases of paralytic strabismus by operation. Before operating he required assurance that: (1) the diplopia was so troublesome that the eye was kept covered; (2) it had persisted a long time without improvement; (3) a neurologist had advised that no further improvement was to be expected; (4) the patient was told the operation was only palliative. He had found patients grateful for what seemed objectively only small improvement.

Mr. **D. V. Giri** and Mr. **M. Hepburn** also described unusual cases of squint on which they had operated.

Among the many individual papers read at the congress only a few lend themselves to brief abstract.

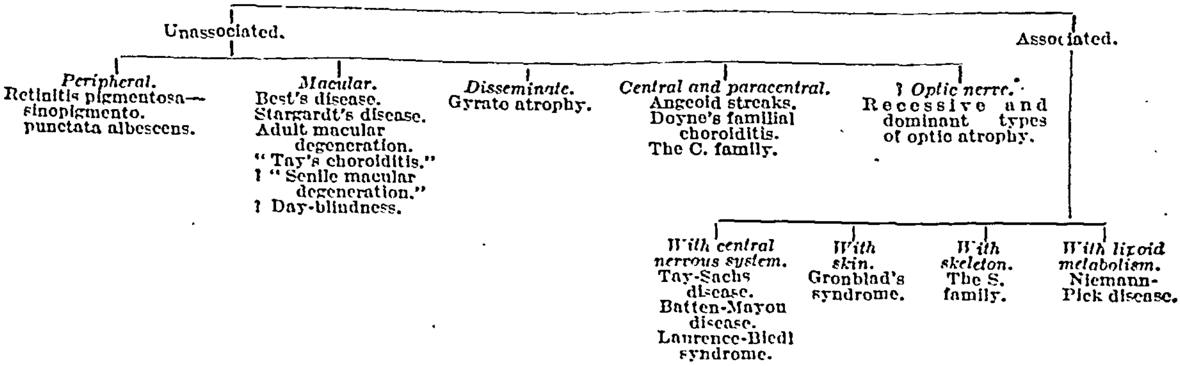
PULMONARY EMBOLISM FOLLOWING OPHTHALMIC OPERATIONS

Mr. **E. Wolff** suggested that there were many more cases than the literature would leave one to suppose. He discussed current theories on the causation of pulmonary embolism generally, and concluded that the operation on the eye per se has probably nothing to do with it. Finally he described a case which he thought might help to throw some light on causation.

RETINAL ABIOTROPHY

Mr. **A. Sorsby** began with Paget's conception of "premature degenerations . . . diseases only in consideration

RETINAL ABIOTROPHY



of the time of their occurrence" (1853), and Gowers's definition of abiotrophy (1902). He compared the modern application of terms dystrophy and abiotrophy, hereditary ocular degenerations of Treacher Collins (1919–20), "ophthalmic abiotrophies" with Leber's concept of tapeto-retinal degeneration (1916). He then attempted a classification of his own (see Chart).

ATROPINE IRRITATION AND ITS PREVENTION

Mr. R. G. WALLER discussed atropine irritation from the clinical point of view. Sensitivity to atropine presents certain aspects not unlike the phenomena known as allergic. So far as is known there can be no true allergy in connexion with a pure alkaloidal salt such as atropine sulphate, since allergic phenomena are associated with proteins. The possibility of a chemical or physical combination between atropine sulphate and the proteins of tears was suggested, with a rational line of therapy based on this assumption. A technique was described for the preparation of a solution of the alkaloid in human tears with a view to obtaining an alkaloid-protein combination to be used as a desensitising agent, and an account given of the therapeutic effects obtained in a series of 30 cases.

CALCIUM AND PARATHYROID THERAPY IN PROGRESSIVE MYOPIA

Mr. F. W. LAW set out the results of this treatment in a group of 27 myopes, between the ages of 6 and 14 years, discovered amongst 1300 sent for refraction to a municipal clinic. They were all proved to be progressive by observation for at least 12 months before treatment was begun, and no conclusion was drawn until 9 to 12 months of treatment had been given. The cases were divided into five categories. The majority of cases responded favourably: of 17 who satisfied all the conditions 13 showed definite benefit, and the use of the drugs should be given a prolonged trial in cases of this serious disease.

REPRESENTATION OF THE RETINA IN THE GENICULATE BODY

Mr. G. PENMAN gave the evidence, derived partly from animal experiments and partly from observations on pathological conditions in human beings, of the representations of the areas of the retina in the lateral geniculate body. This geniculate body is arranged in laminæ of cells, in which the optic nerve-fibres terminate, those from the same and from the opposite side going to different laminæ. The macular area is more restricted than previous observations have suggested, and is represented by a median sector which is definitely limited to the caudal two-thirds of the nucleus. It involves all the cell laminæ. Fibres from the nasal half of the macula undergo complete decussation in the chiasma, while those from the temporal half remain uncrossed. The whole width of the cell laminæ in the oral third of the nucleus is concerned with peripheral vision. The upper part of the retina is represented in the medial portion of the nucleus, the lower in the lateral portion, as stated by Brouwer and Zeeman.

HETEROPHORIA IN AVIATION

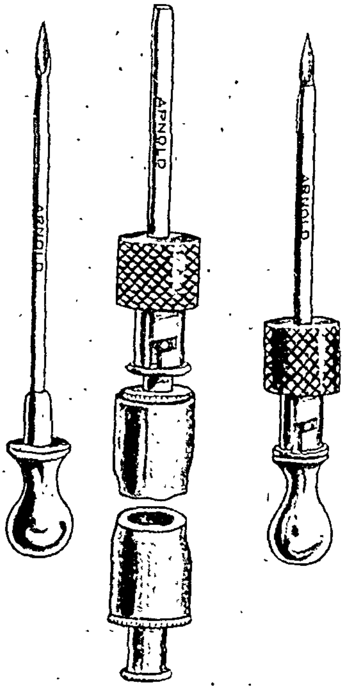
Squadron-Leader P. G. LIVINGSTON spoke of the importance of visual judgment in modern flying. The manœuvring speed of aircraft is increasing year by year, and though the landing speed is kept within certain limits by various mechanical devices, it is, with the passage of time, becoming definitely greater. Heterophoria is an outstanding cause of errors of judgment in landing. The condition may develop in the borderline cases admitted while they are undergoing flying training, or it may come about as a complication of head injuries with concussion, with a marked convergence weakness as is commonly shown. It may result from the effects of illness, or through continued exposure to sun glare. The training of cases so suffering by amblyoscopic and stereoscopic exercises has shown that, with care in selection, over 90 per cent. of cures have been brought about.

ALDERSHOT MATERNITY UNIT.—Lady Isobel Gathorne-Hardy, wife of the general officer-in-chief, Aldershot Command, recently opened a maternity unit which has been added to Aldershot Hospital. The building includes eight wards, several private wards, and a creche.

NEW INVENTIONS

A TROCAR AND CANNULA FOR THE INJECTION TREATMENT OF HYDROCELE

THERE are numerous types of trocar and cannula used for tapping hydroceles, but the one which I have had specially adapted for my own use has proved both practical and satisfactory. It consists of a trocar and cannula, made in two sizes (the large size equal to a 10 S.W. gauge, and the small size equal to a 12 S.W. gauge), and a rubber connexion piece with special bayonet fitting mount. The trocar and cannula is introduced into the hydrocele sac, and the finger-piece is firmly grasped between the thumb and index-finger of the left hand. The trocar is then withdrawn. After all the fluid in the hydrocele sac has been evacuated a 10 c.cm. syringe is charged with a suitable solution and attached to the cannula by means of the rubber connexion. This connecting piece allows of a certain amount of flexibility in the manipulation of the syringe during the process of injection. At the completion of the injection the cannula is removed and the parts are massaged.



The trocar and cannula is made for me by Arnold and Sons (John Bell and Croyden), 52, Wigmore-street, London, W.

RODNEY MAINGOT, F.R.C.S. Eng.

ABERDEEN ROYAL INFIRMARY.—The total cost of the new infirmary being built at Foresterhill is now estimated at £484,000, and since the building fund falls short of this amount by £72,000, it has been decided to reopen the appeal for money. It had been intended to provide 580 beds, but the number has had to be reduced to 500. Last year the infirmary received 6709 in-patients and treated 25,000 out-patients. The average daily number of beds occupied was 379, and the average stay 21 days.

ADULT CONVALESCENT HOMES FOR LIVERPOOL.—At the annual meeting last week of the Children's Convalescent Home at West Kirby, Dr. W. M. Frazer, medical officer of health for Liverpool, stated that the matter of convalescent accommodation had not been satisfactorily dealt with in that city. Seeing that most of the voluntary and municipal hospitals in Liverpool are in overcrowded and built-up areas, where the air is unsatisfactory, and where comparatively little sunlight can enter most of the rooms, he was satisfied that convalescent homes were desirable for adults as well as children.

REVIEWS AND NOTICES OF BOOKS

Obstetrics and Gynecology

Edited by ARTHUR HALE CURTIS, M.D., Professor and Head of the Department of Obstetrics and Gynecology, Northwestern University Medical School. London and Philadelphia: W. B. Saunders Co. Ltd. 1933. Vols. II. and III. Pp. 1135 and 1201. In complete sets of 3 vols., £8 5s.

THE completion of this fine compilation on obstetrics and gynæcology will be welcomed by those who studied the first of the three volumes, reviewed in our columns in September last. That volume dealt with history, anatomy, embryology, physiology, normal pregnancy, and labour, and made a start in the consideration of pathological conditions in pregnancy. Though the clinical chapters reached a standard rather less high than those on morphology and physiology, which were of outstanding merit, the reader was left with a keen desire to possess the two succeeding volumes.

These have now appeared and deal with the pathology of labour and the puerperium, and with gynæcology. The selection of a large number of authors, each writing on a small section of the subject, is, as we anticipated, more successful in the section of the work allocated to gynæcology, which lends itself to this treatment better than does obstetrics. Many men of world-wide repute are among the authors, and the chapters on endocrinology seem to us the most important and valuable feature of the whole work; Edgar Allen writes on theelin, G. W. Corner on the corpus luteum, P. E. Smith and E. T. Engle on the anterior pituitary secretion, and Emil Novak correlates the scientific work with clinical conditions in chapters on gynæcological endocrinology, uterine hæmorrhage, amenorrhœa, and the menopause. These chapters give much important information which is not to be found in the ordinary general text-book. The subjects of clinical gynæcology are also dealt with thoroughly and efficiently, and the long list of references to the literature at the end of each chapter serves the needs of students who wish to consult the original papers on the subject. The section on sterility by I. C. Rubin, and those on roentgenography by James T. Case, and on radiotherapy by Curtis F. Burnam, are worthy of special mention. There is a little overlapping in places: for example, illustrations of reconstruction of the urethra appear in the chapter on prolapse as well as in that on fistula. The chapter on prolapse is not good; it gives little description of the condition, and is mainly devoted to operations for its cure, though the work of Donald and Fothergill is ignored. In the chapter on blood transfusion space is wasted by the inclusion of detailed description of cases of non-gynæcological conditions treated by this method, some of them being males.

Obstetric operations are described by a number of authors. In our view there was no need for a separate chapter on episiotomy, which does not even mention lateral episiotomy, preferred by many to the central incision. The chapter on puerperal sepsis, by B. P. Watson, gives an excellent account of the pathology and treatment. In some other conditions, such as accidental hæmorrhage and contraction ring, the descriptions of the pathology are inadequate for a book of this size. The methods of treatment recommended are sometimes not in accord with English practice; for instance, uterine drainage and injection of glycerin for sepsis are condemned.

The book is well illustrated, both from the pathological and operative standpoints, with numerous photographs and diagrams. Each volume has an index and a separate index covers the whole work. Altogether a worthy production.

The Science of Radiology

Edited by OTTO GLASSER, Ph.D., Cleveland Clinic Foundation. London: Baillière, Tindall and Cox. 1933. Pp. 450. 25s.

THIS interesting volume has been produced in connexion with a successful radiological congress held at Chicago during the Fair of 1933, in which the five main American radiological societies collaborated.

Dr. Otto Glasser, whose "Life of Roentgen" was recently reviewed in these columns, acted as editor, and has contributed authoritative chapters on Roentgen and the Curies and their discoveries. The remaining 23 chapters by different experts cover the whole field of radiology. All, within the very circumscribed limits, are good. Practically every phase of radiology is dealt with—technique, dosimetry, diagnosis, physics, biological effects. X ray cinematography is apparently destined to play a large part in the scientific investigations of biological problems, and the author of this section, H. A. Jarre, has summarised well the attempts made to solve the technical problems concerned. The section on the teaching of radiology, by J. T. Case, is well worth study. G. M. MacKnee deals with cutaneous X ray and radium therapy. We would commend this section to those who have been so engrossed in investigating the effects of radiation on malignant disease that they are inclined to overlook the considerable field of usefulness for these rays in non-malignant conditions, and more particularly in dermatology. Those who are interested in the borderlands of radiological work will find satisfactory chapters on ultra-violet and infra-red radiations, cosmic rays, and Gurwitch rays.

This book provides a worthy memento of a successful congress.

Four and a Half Years

A Personal Diary from June, 1914, to January, 1919. By the Rt. Hon. CHRISTOPHER ADDISON, P.C., M.D., F.R.C.S. Vol. II. (1917–19). London: Hutchinson and Co. 1934. Pp. 629. 18s.

THE first volume of Dr. Addison's record of the war years was reviewed here on its appearance at the beginning of the year. The second volume is now issued and completes the author's personal story of the most critical period of our national history, during which the diarist was in succession head of two great bureaux, the Ministry of Munitions and the Ministry of Reconstruction. The story ends with the significant episode of the dissolution of the Local Government Board when Dr. Addison was appointed the first Minister of Health.

This volume is not easy reading, and how should it be, as it contains the description of the formation and activities of the main Government departments while the fortunes of the country fluctuated during the last 18 months of the war? The interplay of events and personalities is extremely difficult to follow and, from the medical point of view purely, it is not worth following. Dr. Addison deals with the reactions of various important public men to proposed official changes, to methods for making increasingly effective designs both of offence and defence, and to general plans for reconstruction at the end of the struggle. Such chapters as those which set out the emergency problems at home, the complications of the Irish question, the preparations for demobilisation, journalistic interventions and election machinery have no special medical message except what may be extracted from their psychological interest, and this is of a somewhat painful character in view of certain revelations or allegations. It is an unfortunate fact that Dr. Addison should have received not infrequently unfavourable impressions of the work of some of his colleagues. In the references to food control it is curious that little or nothing should be said conspicuously about the influence which the scarcity of food had on public health, but for Lord Rhondda's courage and energy Dr. Addison has frank words of praise.

Dr. Addison's two large and detailed volumes—and the details are indeed voluminous—do not form a war diary, but they give an inside view of the conduct of material affairs during the war period. As such they afford valuable information, and if little or none of it is of close medical interest, it must be recalled that the years of the narrative correspond with a break in the author's direct work in medical fields. The entries cease just before Dr. Addison's appointment as first Minister of Health, an appointment which may be regarded as consequent upon his pre-war activities, which, in connexion with the National Insurance Act, had been of first-class medical importance.

Red Medicine

Socialized Health in Soviet Russia. By Sir ARTHUR NEWSHOLME, K.C.B., M.D., and JOHN ADAMS KINGSBURY, LL.D. London: William Heinemann (Medical Books) Ltd. 1934. Pp. 324. 10*s.* 6*d.*

THIS book was noticed at some length in THE LANCET by an American correspondent at the time of its recent issue in the United States. It is a responsible account of Russian public health administration under the Soviet Government, and its message is to suggest that Soviet ideas are providing medical and hygienic service in accordance with the socialistic views of the Government. The book is now published in England and will interest all students of sociology and workers in public health and welfare directions.

Introduction to the Vertebrates

By LEVERETT ALLEN ADAMS, Assistant Professor of Zoology, University of Illinois. New York: John Wiley and Sons Inc.; London: Chapman and Hall Ltd. 1933. Pp. 414. 21*s.* 6*d.*

THIS book, divided into three parts, deals first with the characteristics, phylogeny, and classification of the chordates, including fossil forms. Nearly fifty illustrations of representative types serve to make the classification something more than a long list of names. In the second part the five main divisions—i.e., fishes, amphibians, reptiles, birds, and mammals—are described anatomically with a view to giving the reader an outline of the morphology of the types, very little detail being supplied. In the third section the various tissues—e.g., the integument, the skeleton, the muscles—are discussed in considerable detail, typical examples of the various classes being compared in order to emphasise evolutionary development. This method of treating the subject has considerable advantage in that the student can either skim over it or delve deeply; it carries the risk, however, that the knowledge acquired will be rather disjointed. Numerous illustrations are included in which essential features are emphasised and artistic detail is omitted.

To anyone wishing to study the vertebrate without any previous knowledge of biology this book may be recommended.

Pharmacopœias and Formularies

A Compendium of the Pharmacopœias and Formularies (Official and Unofficial), with Practical Aids to Prescribing and Dispensing. Seventh edition. By C. J. S. THOMPSON, M.B.E., Hon. Curator, Historical Section, Royal College of Surgeons of England. London: John Bale, Sons and Danielsson Ltd. 1933. Pp. 381. 10*s.* 6*d.*

THE title of this work gives a fair idea of its scope. It contains a list of official and unofficial modern remedies with their solubilities, properties, and doses; synopses of the British and foreign pharmacopœias; useful formulæ selected from the B.P.C., hospital pharmacopœias, formularies, and other sources; stock mixtures, preparations for the feet, nasopharynx, and the toilet; notes on invalid foods, antiseptic dressings, the treatment of burns, and on medicated baths; and memoranda on bacteriological work in relation to medicine—on urine and milk analysis, and on sterilisation. Information is also given regarding the Poisons and Pharmacy Act, the Dangerous Drug Regulations, incompatibilities, and antidotes to various poisons. There are included an index of diseases and the various remedies which have been employed in them; and numerous tables, one giving the doses of the commoner drugs used for animals in veterinary practice. The work has been brought up to date, and should continue to prove a handy book of reference for the busy practitioner.

Lord Lister

By C. J. S. THOMPSON, M.B.E. London: John Bale, Sons and Danielsson Ltd. 1934. Pp. 96. 5*s.*

THIS short book has been written to supply general readers and students with a brief account of the career of the founder of aseptic surgery. We have details of his life as a student at University College Hospital and as an interne at the Royal Infirmary, Edinburgh; sketches of surgery before the antiseptic era; and an interesting account of how Lister's previous work led up to surmises and convictions, experiments and success. The sketch closes with an estimate of Lister as a benefactor to humanity. As hon. curator of the historical collection in the museum of the Royal College of Surgeons of England, Mr. Thompson was in a happy situation for adding, as an appendix, a guide to the collection at the College of relics, instruments, documents, and manuscripts relating to Lister. The author acknowledges his indebtedness to Sir Rickman Godlee's well-known biography, and has been happily inspired in his desire to make Lister's story available in this brief form.

ERRATUM.—In a review published in our issue of April 7th, p. 740, Mr. Alan Macey was incorrectly described as "M.D." We regret the mistake.

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Vide *British Medical Journal*, March 15, 1930, pp. 488–9 and 495–6 and April 5, 1930, pp. 669–70. *The Lancet*, March 15, 1930, pp. 573–4 and 587. *British Journal of Anæsthesia*, April and July, 1930, and January, 1931. *Proceedings of the Royal Society of Medicine*, May, 1930, pp. 919-928. *British Journal of Urology*, June, 1930, pp. 129, 130, and 179. *Edinburgh Medical Journal*, April, 1931. *St. Bartholomew's Hospital Journal*, February, 1931, pp. 93–96, etc. etc.

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THE LANCET

LONDON: SATURDAY, APRIL 21, 1934

RESISTANCE TO STREPTOCOCCAL FIBRINOLYSIS IN RHEUMATIC CHILDREN

It is not yet generally known outside laboratory circles that a new property has recently been demonstrated in pyogenic streptococci which may have an important bearing on their activities within the body. This is the formation of a substance which liquefies fibrin, and it is not difficult to picture the contribution which the activity of such a substance may make to the rapid extension of acute streptococcal lesions. Although the solution of fibrin by streptococci was first observed some years ago in slide cell plasma cultures at St. Mary's Hospital by R. M. Fry, the significance of this change was not then appreciated, and it has been left to W. S. Tillett and R. L. Garner,[1] working at the Johns Hopkins Hospital, to study the phenomenon in detail. The main facts established by these authors are that coagulated human plasma is liquefied, usually within a few minutes, by cultures of *Streptococcus pyogenes* from a variety of human sources, or by filtrates of such cultures; on the other hand, streptococci of animal origin are usually incapable of inducing this change, and animal fibrin is resistant to it. No other bacterial species has been found capable of this fibrinolysis; it is an effect which, as far as we know, is confined to streptococci of human origin acting on human fibrin. A further observation of great importance, recently investigated by Tillett, Edwards, and Garner,[2] is that recovery from acute streptococcal infections, exemplified by scarlet fever, tonsillitis, otitis media, and sinusitis, is accompanied by the development of resistance to fibrinolysis, the patient's coagulated plasma remaining solid for hours, or throughout the maximum period of the test, in the presence of a streptococcus culture which lyses normal plasma clot within a few minutes. The development and subsequent decline of this resistance was studied by repeated examination of the blood, and shown to be a specific change by the negative results of similar observations in cases of non-streptococcal disease. Since recovered case serum confers resistance to lysis on normal plasma, it may be assumed that the property of resistance is due to the formation of an antibody.

We print on p. 834 of our present issue an article by Prof. Geoffrey Hadfield and his co-workers, in which these observations are confirmed and extended in new directions. The first of these concerns variation in the fibrinolytic power of streptococci and its relation to their other characters. Such variation was considerable, and suggested subdivision of the strains studied into three groups, according to the time required for fibrinolysis under standard conditions. This grouping corresponded broadly to the degree of severity of the infections from which they were derived, and to the degree of virulence for mice, rapid fibrinolysis being an attribute of the more virulent strains. It was found further that these strains formed colonies of rough or matt appearance, whereas smooth (glossy) strains were weakly fibrinolytic; degradation of matt strains after repeated subculture to the glossy type was accompanied by partial loss of fibrinolytic power. It appears, therefore, that capacity for fibrinolysis goes hand in hand with virulence and "roughness." The further studies reported in this paper concern the nature of resistance to fibrinolysis, and include what appears to be a conclusive demonstration that this resistance is developed by patients suffering from rheumatic fever. It will be remembered that E. W. Todd demonstrated[3] the presence in the blood in this disease of an antibody which neutralises the hæmolysin of the streptococcus, an antibody which also appears after acute infection known to be streptococcal, and is present only in smaller amounts in the blood of unaffected subjects. This observation has since been repeatedly confirmed, and is perhaps the strongest evidence we have in favour of the streptococcal origin of acute rheumatism. What Prof. Hadfield and his colleagues at Bristol have done is the equivalent of Todd's work in the new field of fibrinolysis, and it must be granted the same significance. This method may prove a useful new weapon with which to attack the unsolved problems of acute rheumatism. Of the study of the action of streptococcal products on fibrin, both as an in-vitro phenomenon and as it concerns the progress of natural infection, and of antifibrinolysin, the name by which the newly discovered antibody will presumably have to be known, we shall no doubt hear much more before long.

What may appear in this connexion a somewhat confusing observation has also been made by Tillett and Garner[4]—namely, that certain strains of streptococci are highly agglutinable by normal plasma, the active element in the latter being either its fibrinogen (chemically isolated fibrinogen exerting the same effect) or a protein closely related to it. This observation is of some interest as illustrating a form of entirely non-specific agglutination, but since the substance responsible may apparently be formed in excess in the early stages of acute infections of many kinds, and is also present in the separated serum, it affords a warning against too ready acceptance of agglutination tests as evidence of streptococcal activity in any acute febrile state.

SPECTACLES OF CRUELTY

Doubts on the propriety of public exhibitions involving physical suffering have of late been given considerable prominence in Parliament and elsewhere. Films showing fatal accidents, both by car and aeroplane, admittedly indicate a triumph of modern enterprise and technique, but their display to the general public offends people whose sentiments—perhaps old-fashioned—make them abhor the thrill associated with such sights, though the exhibitors of the films may rely upon just that thrill as a popularising element. Apart from the matter of cultivation of taste—which in any event tends to vary from generation to generation—it is difficult to specify what harm could result from such a show, except possible damage to nervous people by stimulating unpleasant ideas or by exacerbating symptoms. The acceptance of an arbitrary standard of good taste as a criterion of censorship might be really only a concession to squeamishness or taboo, both of them potent factors in the production of unhealthy reactions. But other than good taste is often involved; as, for example, in some pretended jungle films portraying animal fights to the death, in which there is more than a suspicion that the fight is a staged episode that would never occur naturally. Two fresh considerations arise here: first, the infliction of pain and terror, the objection to which rests upon something more absolute than good taste and yet, like that, is dependent rather upon emotion than argument, the final sanction for its prevention being that the deliberate infliction of suffering upon animals is repugnant to most of us; secondly, there is the danger of stimulating tendencies to cruelty—a very real danger. The word sadism has passed into our common speech; the existence and nature of that aberration is generally if only partially recognised, and it is noteworthy that little official censorship is exercised over publicity that directly appeals to it. Censorship over details of normal sexual behaviour is still exercised and is occasionally defended by the assumption—not often specifically formulated—that their publication would lead susceptible readers to embark precipitately upon action that, whilst within the limits of the biological norm, would be socially undesirable. That harmful sadistic behaviour may be stimulated, or that sexual impulses of a sadistic nature may find gratification, by details or actual exhibitions of cruelty, is well known to psychopathologists who, if given the power, might exercise a censorship in unexpected directions.

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[1] Jour. of Exper. Med., 1933, lviii., 485.

[2] Jour. Clin. Invest., 1934, xiii., 47.

[3] Brit. Jour. Exper. Path., 1932, xiii., 248.

[4] Bull. Johns Hopkins Hosp., March, 1934, p. 145.

There is, we are told, a sadistic component in all of us. Indeed, an excessive reaction against cruelty is, with the usual contrariness of psychoanalytical theory, ascribed to over-compensation of that component. Differences of opinion with regard to the necessity of war depend fundamentally upon differences with regard to the possibility of directing this element of human nature. The satisfaction of the aggressive impulse is provided for in our social organisation with the purpose, generally undefined but nevertheless present, of turning it to desirable or at least harmless ends. Not as a matter of good taste but as a matter of policy it is surely proper to seek to prevent exhibitions that may foster the tendency to cruelty that exists, overt or latent, in mankind. We therefore support the protests being made in Parliament against the proposed repetition of the rodeo exhibition in this country. This involves obvious cruelty to beasts which, being stabled, are pitiful substitutes for the semi-wild cattle whose handling may call for such methods; and here it should be mentioned that in the cattle country of Australia such methods are unknown, though exhibitions of drafting and cutting-out cattle are attractive additions at country shows. Cruelty to the bucking horses is not so obvious to the spectator as are the broken legs and horns of the cattle, but whereas the successful conquest of a genuine buck-jumper is a performance that legitimately satisfies the aggressive tendencies of performer and onlooker, it is common knowledge to Australian bushmen that no stabled horse retains the habit, which can be reproduced only by the use of severely painful measures. The association of cruelty with rodeo performances is undoubted. Some spectators may obtain satisfaction for their sadistic trends from the thrill they experience in watching them. Let us hope at least that, if the performance is after all permitted, the ultimate result will be only satisfaction and not stimulation.

THE RECOGNITION OF CHIROPODY

AT a Council meeting of the British Medical Association held on April 4th an interesting debate centred around the question whether chiropodists, approved in accordance with a clearly defined range of duties, should be accorded a measure of professional recognition. Chiropodists possess an official representative body, and the desire for recognition emanated from them, while already there is at least one hospital in London, known simply as the Foot Hospital, where cases are under treatment which conform to the definition, popular or scientific, of chiropody. On the question of professional recognition arising, inquiry was made by the British Medical Association of the Incorporated Society of Chiropodists with the result that the following definition of chiropody was mutually agreed upon: "Chiropody means the treatment of abnormal nails, and all superficial excrescences occurring on the feet, such as corns, warts, callosities, and bunions." It was further agreed that not even within that field should chiropodists operate for deformities, or treat any condition either involving tissues below the skin level or requiring general or local anæsthetics. Subject to the definition and the reservations the Ethical Committee of the B.M.A., to which body the questions were referred, reported in favour of recognition.

Dr. LANGDON-DOWN, in proposing the acceptance of this report by the Council, pointed to the modern developments in the field of chiropody, to the rise of institutional treatment, and to the fact that the sphere of therapeutic action under discussion had been left vacant in medical practice. It must be remembered that no discussion of the proposed field of work could take place in the Council, as definition of chiropody and the limitations of its scope had already been agreed upon between the B.M.A. and the representative body of the chiropodists. On that agreement the report had been framed, so that the obvious difficulties of including such a complaint as a bunion inside the domain of dermatology could not be discussed;

the Council were asked to register an opinion on the general situation as set out by the report. The measure of recognition suggested in the document was definitely objected to by certain members of the Council on the ground that no person who had not passed through a medical curriculum could be held as competent to diagnose and treat disease; and as the main significance of the Medical Act lies in the provision to the public of knowledge whether a practitioner has passed the necessary educational tests for registration, the objection was obviously forceful. But the old difficulty remained for consideration as to how far therapeutic procedures ancillary to professional medical treatment can be regularised, seeing that these procedures are, if properly guarded, of obvious public utility. Sir HENRY BRACKENBURY, speaking from the chair, set out the position, as he saw it, succinctly. What was he to do, he asked, if a person came to him with a bunion which he did not care to treat? He considered it common sense that such sufferers should go to the chiropodist, and as the chiropodists possessed a representative body with which certain well-known surgeons were associated, it was reasonable that they should receive the measure of recognition asked for.

The crux of the situation must have seemed to the Council to be the fact that support was already afforded to organised chiropody by the medical profession, for the Council agreed by 16 votes to 12 to recommend to the Representative Body that the defined measure of recognition should be given to the chiropodists, a decision being also reached, by 17 votes to 8, to refer back to the framers of the report a recommendation to include within the National Register the names of members of approved organisations who practise chiropody.

THE BUDGET

THE past year, and especially the past few months, has seen a better understanding of poverty and a greater sympathy with the poor. More and more people have come to realise that unemployment is no crime—that nowadays the means of livelihood are distributed less according to merit than according to the wayward working of economic machinery which has partially broken down. Authoritative reports on housing and feeding have worked on the public mind in such a way that there will be a widespread feeling of relief that Mr. CHAMBERLAIN's Budget has first of all restored to the unemployed the full rate of benefit reduced in 1931. Much of the bitterness of discussions on the Unemployment Bill could have been avoided if this concession had been announced as soon as last year's surplus became certain: and the scale, with its continuing 2*s.* for each child, remains inadequate for maintenance over long periods. But the change, which comes into force in July, will allow the new Unemployment Assistance Board to adopt a more generous policy than would otherwise be possible, and it may have the indirect effect of raising wages of the lowest grades.

As to the salary cuts of 1931, inflicted on members of military and civil forces, judges, doctors, and teachers, they have all of them given rise to irritation; some indeed may be said to have led to something like blood-poisoning. The fact that, among the sufferers, panel practitioners have complained comparatively little does not mean that they will by any means despise the half-cure wrought by the Chancellor's return of 5 per cent. of the insurance capitation fee. They will also benefit with other taxpayers by the 6*d.* reduction in the standard rate of income tax. Most members of the medical profession would probably have gained a good deal more by restoration of the old allowances permissible on small incomes, but the Chancellor regards the subtraction of 6*d.* from the standard as much more likely to stimulate trade. Apart from a somewhat surprising gift to the motor industry, this is indeed his chief contribution to industrial recovery; for he has decided to use the whole of last year's surplus—bought at no little cost—for repayment of the National Debt, and on the basis of this year's taxation he calculates that he will have only about £29,000,000 to devote to increase of expenditure or relief of the taxpayer. This cautious estimate explains why the Budget offers no provision for such projects as the raising of the school age, the distribution of milk to all school-children, or the encouragement of surveys and research—not to speak of large public undertakings or loans for reconstruction in the derelict areas. Mr. CHAMBERLAIN, conscious of heavy responsibilities, defers such expenditure until such time as it can be met from income, and meanwhile continues his example of economy; he holds, with show of reason, that the tonic effect of his surplus has been worth the privations that brought it into existence, and he evidently hopes to repeat the prescription next spring. In times of uncertainty such as the present, this point of view is incompatible with the use of the Budget as an instrument of national development, and those who are urgent for new plans for a new society will find little in its favour. It has, nevertheless, the merit of expectedness. The Government have been consistent in their anxiety to restore financial confidence and in their condemnation of financial experiments, and by giving full expression to this policy the present Budget provides something to please everybody. Supporters will find no fault with its evident soundness; the public will be thankful for its reliefs; and opponents will feel an inverted satisfaction, because it leaves them with nearly all their major criticisms of the Administration unimpaired.

SOVIET INSTITUTE OF EXPERIMENTAL MEDICINE.—A branch of the All-Union Institute of Experimental Medicine has been established in Moscow, its members including Profs. Rozenkov (director of the branch), P. P. Lazarev, Propper (assistant director), Krol, Levit, Konchalovsky, and Shaternikov. Its work will deal with human physiology and pathology, and special attention will be paid to the connexion between the higher nervous activities and the functions of sense organs. Laboratories for studying industrial physiology have been provided, and climatic stations have been opened in Yalta, Murmansk, Prozorovka (near Moscow), and Ashkabad.

a total of 5216 showed a loss of 8 to 18 units, and 0·75 per cent. a loss of 21 to 30 units, but that only three children of the total 2608 examined had a loss of 21 units or over in the better ear. It is obvious that the slighter degrees of deafness, and many cases of unilateral defect, would have escaped detection without some such method of wholesale examination; this is well shown by the fact that the returns for the routine medical inspection of school-children given in the annual reports of the chief medical officer of the Board of Education have, for some years past, recorded the incidence of defects of hearing as slightly less than 0·5 per cent.; indeed, the Board states that deterioration of hearing may go on for some time before it is detected. A reliable physiological method of assessing the hearing of school-children with reasonable speed is of the greatest value in detecting deafness at an early stage, so that appropriate treatment may be instituted; Dr. Crowden furnishes charts which demonstrate the improvement which has occurred after treatment. A modification of the gramophone audiometer has been made for the examination of children of pre-school age who are unable to write; this consists in a record of a series of words combined with pictures of objects which they represent.

THE ÆTIOLOGY OF AGRANULOCYTOSIS

CASES of agranulocytosis fall roughly into two groups—those secondary to sepsis or to administration of certain drugs, and those which are called primary or idiopathic because their cause is unknown. The number of chemical substances now recognised as capable of injuring the bone-marrow of susceptible persons is rapidly increasing. The injury may affect all the marrow components, giving the typical picture, during life, of an aplastic anæmia; or it may depress only one marrow element. Benzene derivatives usually produce a sharp fall of red cells, white cells, and platelets, but they may affect the granulocytes selectively; similarly, arsenobenzol derivatives may have a selective action upon these cells. Dameshek,[1] who has recently reviewed the hæmatological reactions recorded as following administration of gold salts such as Sanocrysin, shows that these have included complete aplastic anæmia, agranulocytosis, and thrombocytopenic purpura. It seems that the barbiturate group of drugs also—given alone or in combination with amidopyrin—may exert a selective toxic influence upon the marrow elements, more particularly the granulocytes. Watkins[2] reports that 24 out of 32 patients with primary agranulocytosis coming under his observation had taken one or both of these drugs before the onset of symptoms, while Madison and Squier[3] have described 14 cases in which the onset of symptoms was directly preceded by use of amidopyrin either alone or in combination with a barbiturate. When single doses of amidopyrin were given to each of two patients who recovered from the acute disease, their granulocytes were much reduced. In our present issue Dr. F. E. Loewy describes two cases of thrombopenic-hæmorrhagic purpura attributable to use of the hypnotic Sedormid (allylisopropyl-acetyl-urea) which is allied to the barbiturates. Both Loewy and Madison suggest that these effects are due to an allergic or "anaphylactoid" drug reaction. The widespread use of the remedies under discussion, compared with the rarity of agranulocytosis, indicates that, as with so many poisons, idiosyncrasy plays an important part in determining the character of the reaction.

Of cases commonly regarded as primary agranulocytosis, there are some at least in which yet other ætiological factors are concerned; for there is sometimes apparently a relationship between the neutropenic episodes and the hormones associated with menstruation. Over 80 per cent. of the recorded cases of agranulocytosis have been in women, and Thompson found that in 17 out of a group of 18 cases the subjective symptoms of agranulocytosis developed within one or two days of the onset of the regular menstrual period, and that all the patients were menstruating when admitted to hospital. In six of them there were one or more recurrences of neutropenia, always in association with menstruation. Jackson and Merrill have now reported in detail[4] the case of a woman who had had recurrent attacks of agranulocytic angina. She had herself noticed that relapses always took place on the first day of her menstrual period. Her peripheral blood picture was studied closely for ten months, and it was found that with the onset of each menstrual period the total number of neutrophil leucocytes fell precipitately, only to rise again rather rapidly to about the previous level. During this period there were two attacks of acute illness. Thompson[5] has also described the case of a man aged 25 who from the age of 2½ months has been known to have had a cyclic neutropenia. The cycles are identical, the attacks occurring at an interval of exactly three weeks. The fall in granulocytes definitely precedes the onset of fever and buccal necroses; it can be prevented by treatment with nucleotide K.96. If the granulocytes are maintained at normal levels by prophylactic therapy no subjective symptoms appear. As the patient also has diabetes insipidus and other signs suggestive of endocrine disturbance his hormone excretion has been studied, and it has been found that in his case definite variations in the excretion of female sex hormone and of gonadotropic hormone occur in association with a neutropenic period.

Without drawing further conclusions it is clear that in future the possible relationship of attacks of agranulocytosis to menstruation and to certain drugs—especially amidopyrin and the barbiturates—must always be borne in mind.

MORTALITY FROM APPENDICITIS

IN 75 leading American hospitals the number of cases treated for appendicitis has increased from about 18,000 in 1923 to over 26,000 in 1932, and of these nearly 94 per cent. underwent operation. Dr. Frederick Hoffman, who has collected[6] the figures, does not indicate whether there is a real increase in incidence or merely in resort to these hospitals, although he finds that the crude death-rate from appendicitis in 60 American cities (with an aggregate population of 29 millions) has risen from 133 per million in 1910 to 157 per million in 1932. A maximum of 180 per million was reached in 1929, since when there has been a decline. These figures have given rise to some anxiety, and in Philadelphia there has been inaugurated a campaign for the reduction in fatality of acute appendicitis by shortening the time between the onset of symptoms and recourse to hospitals and by preventing the administration of laxatives. A report of its progress is given [7] by Dr. John Bower. The case-fatality rate has, it appears, declined from 5·97 per cent. in 1928–29 to 3·44 in 1932, or by 42 per cent., a part of the improvement being due to earlier hospital treatment. The importance of this factor is suggested by the fact that during 1928 to 1932 only 2 per cent. died of those admitted within 24 hours of the onset of symptoms compared with nearly 10 per cent. of those whose admission was delayed till after 72 hours—though selection may play a part in this result for cases that become quiescent after 72 hours would tend not to be taken to hospital. There has also been some decline in the number of cases of peritonitis and the fatality experienced by them, and a less frequent administration of laxatives is reported. An influence, however, that may, it seems, have been largely responsible for the reduction in the fatality-rate is the considerable increase in the actual number of cases operated upon. In 1928–29 the average number of cases per annum was 2560; in 1930 the number rose to 3095; in 1931 to 3142; and in 1932 to 3546, an increase of nearly 40 per cent. in three to four years. Such figures suggest that there has been a considerable rise in the number of mild cases, which would favourably influence the fatality-rate—i.e., the ratio of deaths to cases. From such a sequence of events it appears that the active measures of such a campaign may reduce the number of deaths in the community but may at the same time increase considerably the "unnecessary" operations which Dr. Hoffman criticises. An increase in mortality, it may be noted, is not apparent in this country. In England and Wales as a whole there has been no appreciable variation in the death-rate from appendicitis over the last 20 years; the rate for males has fluctuated slightly around 80 per million, for females around 55 per million, with no tendency either to rise or fall.

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[1] Dameshek, W.: New Eng. Jour. Med., March 29th, 1934, p. 687.

[2] Watkins, C. H.: Proc. Staff Meet. Mayo Clinic, Nov. 22nd, 1933, p. 713.

[3] Madison, F. W., and Squier, T. L.: Jour. Amer. Med. Assoc., March 10th, 1934, p. 735.

[4] Jackson, H., Jun., and Merrill, D.: New England Jour. Med., Jan. 25th, 1934, p. 175.

[5] Thompson, W. P.: Ibid., p. 176.

[6] Jour. Amer. Med. Assoc., March 17th, p. 862.

NERVE-GRAFTING FOR FACIAL PALSY

A FILM illustrating the results of nerve-grafting for the relief of facial paralysis, as carried out by Dr. A. B. Duel of New York, was shown to the council of the Royal College of Surgeons of England on April 12th. The method adopted is the result of a series of experiments by Dr. Duel and Sir Charles Ballance. A small peripheral nerve is prepared by section in situ 10 to 21 days before the operation, and this nerve is implanted in the Fallopian canal without sutures and covered over with gold foil. Rapid recovery may take place even where the facial paralysis has existed for some time, but in cases of long standing the decision whether operation shall be undertaken must depend on whether the muscles of the face respond to the galvanic current. It is found that when prepared grafts are used the faradic response returns in the palsied muscles in less than half the time required when a fresh nerve-graft is employed. The degenerated nerve-graft consists of a series of tubes through which the axis-cylinders of the central nerve segment push their way.

Sir Charles Ballance left America 18 months ago and has not been able to continue in London the work he was doing with Dr. Duel. The latter, however, has gone on with the research on monkeys and has also, it was stated, treated with great success a large number of patients suffering from facial palsy. In cases of Bell's palsy he has operated on many cases, decompressing the inflamed and swollen nerve in the aqueduct by removing the outer bony boundary of the canal and slitting up the fibrous sheath. Anastomosis of the facial nerve with another nerve in the neck is definitely abandoned for the operation of exposing the nerve in the canal, excising the diseased or damaged portion, and placing a prepared graft in the gap so formed.

On the same occasion Mr. V. E. Negus showed a film illustrating ciliary activity and the action of various drugs on ciliary movement.

MEASLES SERUM

OUR advertisement columns contain the announcement that a limited supply of serum obtained from patients convalescent from measles is available at the London Fever Hospital and may be had by practitioners who wish to use it for the protection of infants and young children. It is now generally agreed that a single injection of such serum is usually sufficient to prevent or modify an attack of measles: if temporary protection is desired the injection should be given on or before the fifth day of incubation; if the object is to ensure a mild attack with subsequent immunity it should be deferred until the sixth to ninth day.[1] The principal obstacle to a more general use of this preventive is the difficulty of obtaining a sufficient supply, and the committee of the London Fever Hospital would be glad if patients who have recently had the disease would volunteer to attend and have blood taken. It is felt that practitioners may be able to bring this useful service to the notice of some of their patients who would like to play a part in safeguarding others.

REFUGEE SCIENTISTS

FOR over a year, through the work of the German Refugees Assistance Fund, a certain number of Germans of academic and professional standing have been enabled to continue their studies, and in some cases to find a paid outlet for their talents. But despite the efforts of a powerful body of supporters, the fact remains that the list of those who need similar assistance is sadly large. It is estimated that there are at least 60,000 refugees of this kind outside Germany, and most of these are dependent to some extent on charity or the kindness of friends, for any savings they were able to bring from their home land are exhausted by now. We are informed that there are 9000 medical doctors on the list of the International Committee for the Relief of Refugee Professional Workers, of whom a proportion—how many is unknown—are in this country. The financial call is very large, but no more worthy object for subscription can be found. The German Refugees Assistance Fund acknowledges that only if large sums are available for making settlements can the destitution really be reduced, but with the coöperation of such societies as the Academic Assistance Council, the International Student Service, the Germany Emergency Committee of the Society of Friends, the International Committee for Assisting Refugee Professional Workers, and the Save the Children Fund substantial support may be hoped for. Comparatively moderate subsidies at the present moment may, however, lead to members of the medical profession who are now in receipt of charity becoming not only self-supporting but able to help others, as witness the following typical cases: "A B, aged 50, married (two children), bacteriologist, dismissed after 21 years' service because grandparent was Jewish, engaged on work of extreme importance; £250 needed for maintenance for one year. C D (M.D.).

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[7] Ibid., p. 813.

[1] THE LANCET, Feb. 3rd, 1934, p. 254; also 1932, ii., 572; 1933, ii., 981.

Was in charge of department in well-known Berlin hospital. Has to keep parents. Can enter into partnership in Italy as soon as he has British qualification. Requires assistance towards paying examination fees, £45. E F (a lawyer) can be re-trained for agriculture in Denmark, and then has chance of going to Palestine, £40. Expenses required for several doctors taking up positions in Turkish hospitals, £120 each." The quotations are from the German Refugees Assistance Fund, and we bring the plea of that Fund before our readers with full knowledge that they have urgent claims upon them already furnished by the needs of our own charities. But their help can be great if they will give publicity to the work of the Fund, and lead the public to realise that the progress of all that makes the world habitable is linked up with the labours of the academic and professional classes. There is no question of the employment of more foreign medical practitioners in Britain, and this is recognised by the Fund.

THE VIRUS OF MUMPS

QUITE apart from the results of attempts to reproduce mumps experimentally there are grounds for believing that it belongs to the group of filtrable virus diseases. It is highly contagious, one attack confers a solid and lasting immunity, and when it has been possible to examine the specific lesion histologically the inflammatory reaction has been seen to be predominantly mononuclear. Experimental investigation of the disease dates from 1908 when Granata published some suggestive findings. M. H. Gordon's[1] work several years later was more conclusive. He demonstrated the presence of a filtrable agent in the mouth washings from early cases of mumps, but in only one instance did he show that this agent was capable of producing a parotitis in experimental animals and serial passage was not achieved. Martha Wollstein[2] carried the matter further. Investigations pursued by her between the years 1916 and 1921 showed that the filtered mouth washings from early cases produced an inflammatory reaction when inoculated into the parotid or testis of the cat and that serial passage was possible, though not indefinitely so, in this animal species. She also found that the virus was present in the blood of patients with severe constitutional symptoms. The ensuing decade saw two further attacks on the problem. Y. Kermorgant's[3] work claiming to show that mumps was due to the combined action of a spirochæte and a Gram-negative bacillus remains unconfirmed and unconvincing, and F. F. Tang's[4] findings in guinea-pigs give the impression that if he was dealing with a filtrable virus it was not the virus of mumps.

Recent work by C. D. Johnson and E. W. Goodpasture[5] leaves little doubt that mumps is in fact produced by a filtrable virus. Their experiments were made on monkeys (*Macacus rhesus*) and the material investigated (fresh saliva) was introduced directly into Stensen's duct in quantities of 2 c.cm. Saliva from six early cases was thus inoculated into six macaque monkeys; two monkeys received a similar inoculation of normal saliva and served as controls. The introduction of this volume of fluid caused an immediate enlargement of the parotid gland which, however, subsided in two to four days. Nothing further happened in the two control monkeys and in two of the six receiving mumps saliva. But six to eight days later the remaining four monkeys developed fever, accompanied by swelling of the parotid gland and œdema of the surrounding tissue. They also showed definite changes in their blood picture: a leucocytosis, appearing just before the onset of pyrexia, was gradually replaced by a leucopenia with a monocytosis and a relative lymphocytosis. Histological examination showed that these glands were the seat of focal degeneration and necrosis affecting single acini or groups of acini. Suspensions of the extirpated parotid glands when passed through Berkefeld filters reproduced the disease in monkeys and serial passage was realised up to the seventh generation. Monkeys which had recovered from the infection proved resistant to reinoculation, but neutralisation experiments with human convalescent sera gave inconclusive results. When it is added that Johnson and Goodpasture also demonstrated the resistance of this filtrable agent to freezing, drying, and glycerol, it will be realised how complete is the story which they present.

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[1] Local Govt. Board, Pub. Health Rep. No. 96, London, 1914.

[2] Jour. Exper. Med., 1916, xxiii., 353; 1918, xxviii., 377; 1921, xxxiv., 537.

[3] Ann. de l'Inst. Pasteur, 1925, xxxix., 565.

[4] Nat. Med. Jour. *China*, 1930, xvii., 360.

[5] Jour. Exper. Med., 1934, lix., 1.

SUMMER Time will commence in Great Britain, Ireland, the Channel Islands, and the Isle of Man on Sunday morning next, April 22nd, at 2 A.M., when the hands of timepieces should be advanced one hour. It will end on Sunday, Oct. 7th.

"INDIA," by Lieut.-Colonel F. D. S. Fayrer, I.M.S. (rtd.), M.A. Cantab., F.R.P.S., is the title of an exhibition at the Galleries of the Royal Photographic Society of Great Britain, 35, Russell-square, W.C.1, which will be held from May 3rd to 31st, 1934.

FOR reasons of health Mr. F. W. Ramsay has resigned his prospective presidency of the British Medical Association during the coming year. In his place Dr. Sydney Watson Smith, physician to the Royal Victoria and West Hants Hospital, has been appointed president for 1934–35, and he will take office at the annual meeting of the Association to be held in Bournemouth next July.

A SPECIAL meeting of the Fellows of the Royal Society of Medicine will be held on Tuesday, May 1st, at 8 P.M., when a demonstration will be given by Dr. Russell Reynolds on X ray cinematography. Some interesting films will at the same time be shown by Dr. Robert Janker of Bonn. The meeting has been devised in order to bring Dr. Janker into contact with Dr. Reynolds, as both have been working with a view to bring cinematograph technique within the bounds of application for use with X rays. Dr. Brailsford dealt with some aspects of this application in an address summarised on p. 877 of our present issue. It should be noticed by Fellows that admission can be by ticket only, and applications for these should be addressed to the secretary of the society at 1, Wimpole-street, W.1.

COURSE ON MENTAL WELFARE.—The Central Association for Mental Welfare have arranged a course for officers of local authorities and local associations for mental welfare engaged in work among the mentally defective. It will be held in London from June 30th to July 21st and will include lectures and practical work. Applications should reach the secretary of the association, 24, Buckingham Palace-road, London, S.W.1, before June 11th.

PROGNOSIS

A Series of Signed Articles contributed by invitation

III.—TUBERCULOUS LARYNGITIS

THE improvement in the prospect of recovery from tuberculosis of the larynx may be well exemplified by quoting Sir Morell Mackenzie, who wrote in 1880 that "the prognosis is always extremely grave, and it is not certain that any cases recover." The second statement in this quotation is certainly no longer true, for a considerable proportion of patients do now recover. This is in part due to a more general early recognition of the disease, for the laryngologists' plea for the routine laryngoscopic examination of all consumptives has been more widely accepted, and in part to the better management of the laryngeal disease by vocal rest and the judicious application of local treatment; but it is chiefly to be attributed to the gradual advance in the treatment of phthisis, and especially to the adoption of such methods as artificial pneumothorax and phrenic evulsion. To-day the advantages of sanatorium treatment have been brought within the reach of a far wider circle of consumptive patients, and accommodation for those in the poorer ranks of life has gradually been made more commensurate with their needs.

FAVOURABLE AND UNFAVOURABLE SIGNS AND SYMPTOMS

Laryngeal tuberculosis is but a complication of pulmonary phthisis, and the prognosis therefore depends primarily on the extent, virulence, and progress of the pulmonary disease, and secondarily on the situation and extent of the laryngeal lesions; that is to say, if the lesions in the lungs are in a curable stage, cure of the larynx is nearly always possible, and is probable if the laryngeal affection is not far advanced. On the other hand, if the pulmonary disease is not curable, the patient will sooner or later die of consumption, even though the laryngeal lesion becomes healed; and in such cases reinfection of the larynx is liable to occur. The condition of the larynx can, and not infrequently does, improve while the disease in the lungs is progressing, but the lungs never get better while the laryngeal disease is advancing. The progress of the general disease, and the resistance of the patient, can only be estimated after some weeks of observation under the most favourable conditions attainable, preferably in a sanatorium, with a careful record of the weight, temperature, pulse, and appetite. The temperament of the patient is also of importance; the *spes phthisica*, so often encountered, is a valuable aid to recovery, but may induce the patient to be careless and intolerant of the details of the régime prescribed; his active coöperation is necessary, and it has been well said that no fool is cured of the disease. Unfavourable symptoms are persistent elevation of temperature in spite of rest, rapid pulse, lack of appetite, loss of weight, and a bad family history. Pregnancy has a particularly bad effect on tuberculous laryngitis, and early induction of abortion has even been advocated.

In mixed syphilitic and tuberculous disease of the larynx the prognosis is bad. Age has an influence on the prognosis, older patients withstanding the disease better than younger ones; tuberculosis is seldom rapidly progressive in persons over 40 years of age. Biological tests may be of service in the estimation of the patient's resistance; Dr. F. R. G. Heaf[1] attaches importance to the information derived from serial examinations of the blood, and finds a rapid sedimentation-rate, with a high monocyte and low lymphocyte and eosinophil counts, of serious import.

THE SITE OF THE LESION

With regard to the site of the laryngeal disease, the most favourable is superficial infiltration or ulceration of the vocal cords, and with similar lesions or papillary outgrowths in the posterior commissure the prognosis is also fairly good. Infiltration at the upper aperture is far more serious than disease within the larynx; partly because it is of greater mass and extent, partly because it usually occurs when the interior of the larynx is already involved, but chiefly because it so often causes dysphagia. This is especially true of disease of the epiglottis, which is of the worst prognostic import; an exception to this is the rare case in which the epiglottis is the only part affected; I have seen two such cases, in both of which removal of the epiglottis resulted in cure. Another exception is the "lupoid" type of tuberculous laryngitis. This is relatively rare, and is associated with chronic pulmonary disease; it attacks the upper aperture early, is painless, and is characterised by slow progress and a tendency to heal with considerable formation of fibrous tissue. Of 255 cases at Mount Vernon Hospital, the proportion of deaths was 1 in 6½ where the epiglottis was involved, 1 in 9¼ in disease of the arytenoids, and 1 in 35 when the cords alone were affected. Perichondritis is of very sinister import, but there is one exception to this, namely, when tuberculosis attacks the thyroid cartilage as a primary disease; in such cases, if the swelling points externally, the outlook is good, especially if, as sometimes happens, there is no pulmonary disease. Miliary tubercles in the larynx are a terminal affection and indicate a rapid dissolution, and so too does the spread of ulceration to the fauces.

THE STAGE OF THE GENERAL DISEASE

In general, the more extensive the tuberculous infiltration the worse is the prognosis; but the mere fact that the larynx has become invaded is a sign of the patient's lowered resistance and lessens the prospect of recovery. Sir StClair Thomson,[2] in following up cases of phthisis, found that the presence of laryngeal tuberculosis doubled the mortality; over an equal term of years, of patients with an intact larynx two out of three will be alive, but only one out of three of those with a laryngeal lesion. He reported in 1914[3] at the King Edward VII Sanatorium arrest of the local disease in 20·7 per cent., and more recently in 1924[4] in 25 per cent.; I recorded at the Mount Vernon Hospital in 1905[5] a proportion of 20·85 per cent. in a series of cases which excluded those admitted in a very advanced stage, chiefly for the relief of dysphagia. But it must be remembered that these figures were compiled before the treatment of tuberculosis in general had progressed as far as it has at present, and moreover that statistics of the cure of laryngeal tuberculosis can never be of more than approximate value, since results depend greatly on the class of patient and on the stage of disease at which these come under treatment. Thus a series of cases seen in private practice, or in sanatorium, where the diagnosis is made in an early stage, will show better results than those treated at a throat clinic, where the patients seldom present themselves until symptoms of trouble in the throat have already become obvious.

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[1] THE LANCET, 1933, ii., 710.

[2] Thomson, StClair: Diseases of the Nose and Throat, London, 1926, 3rd ed., p. 710.

[3] Brit. Med. Jour., 1914, i., 801.

[4] THE LANCET, 1924, ii., 948.

[5] Lake and Barwell: Laryngeal Phthisis, London, 1905, 2nd ed., p. 87.

CONCLUSION

The larynx is far more prone to invasion when the pulmonary disease is advanced than when it is in an early stage. Here again statistics differ greatly: in group I cases of phthisis laryngeal tuberculosis has been found in from 4·50 to 13·75 per cent., among group III cases in between 31 and 72 per cent., and post mortem in from 48 to 83 per cent. The percentage of cases of arrested laryngeal disease is, of course, materially diminished by the large proportion which occurs in a late stage of consumption, where there is no prospect of recovery; in these it is not the disease in the larynx which causes death. But, where the pulmonary disease is still in a curable stage, I would repeat that cure of the larynx is nearly always possible, and we may expect that the percentage of cures will increase as early diagnosis becomes still more frequent and facilities for modern treatment are extended.

HAROLD BARWELL, M.B., F.R.C.S.

Consulting Surgeon for Diseases of the Throat and Ear to St. George's Hospital, and formerly Laryngologist to the Mount Vernon Hospital for Diseases of the Chest.

SPECIAL ARTICLES

MEDICINE AND THE LAW

Blood Test Offer in Affiliation Proceedings

APPEARING last week before the Chatham magistrates on behalf of the mother in affiliation proceedings, an advocate expressed the opinion that, sooner or later, blood tests would be regarded as a necessity in these and other cases. He offered to have the blood of the mother and her child tested, provided that the putative father would also submit to the same test. He also undertook to pay the costs of the medical research involved in the classification and comparison of the blood specimens. The offer was not accepted, and the magistrates seem to have treated it rather as a forensic flourish than as a serious contribution to the evidence; they had, of course, no power to compel the parties to undergo blood tests.

The case was a remarkable one. In 1931 Miss Sophie Batchelor obtained an affiliation order against Mr. John Smith for payment of 10*s*. a week. Mr. Smith strenuously denied paternity; he refused to obey the order and was committed to prison no fewer than 19 times in default of payment. Last February Miss Batchelor was charged with perjury in connexion with the affiliation proceedings of 1931; she was found guilty at Maidstone assizes before Mr. Justice Roche and was sentenced to six weeks' imprisonment. The judge on that occasion expressed the opinion that Miss Batchelor had got her order by fraud and that the order ought not to be further enforced. The original finding of the magistrates against Mr. Smith, however, still stood in spite of the verdict of perjury against Miss Batchelor. Nothing less than an Act of Parliament could undo the magisterial decision that Mr. Smith was the father of Miss Batchelor's child, but Mr. Smith could at least apply to have that part of the order varied which compelled him to pay 10*s*. a week. When Mr. Smith gave evidence for this purpose last week he was asked in cross-examination if he would undergo a blood test. He answered that, if it was legal and if it would alter his obligation, he would undergo any test. The magistrates, without waiting for tests, found themselves able to revoke their order for the payment of 10*s*., inasmuch as it had been made on the faith of Miss Batchelor's evidence, which had now been found to be false. It has since been reported that the magistrates are being asked to state a case on Miss Batchelor's behalf for decision by the Divisional Court. An undertaking was given at the Maidstone assizes that she would take no further proceedings against Mr. Smith; evidently this was not interpreted as barring her from defending herself against Mr. Smith's attack on the order.

If his remarks were correctly reported, Miss Batchelor's legal representative last week seems to have put the evidential value of blood tests surprisingly high. He said he was informed that, out of 20,000 cases where blood tests had been made, it had been possible to establish definitely in 15,000 the existence of a certain blood relationship and to negative it in 5000. His opponent replied that he understood the blood of human beings could be placed in three groups. If the child's blood was found to belong to "A" group and the putative father's to belong to "B" group, it might be possible to say definitely that the man was not the father of the child. If the blood of both belonged to the same group, it would prove nothing. "My own blood might belong to the same group; could it be said in these circumstances that I am the father of the child?"

IRELAND

(FROM OUR OWN CORRESPONDENT)

CONDITIONS IN THE ARMY MEDICAL SERVICE OF THE IRISH FREE STATE

LAST week Mr. F. Aiken, the Minister for Defence, received a deputation appointed by the Irish Medical Committee and introduced by Dr. P. O'Dowd, T.D. The members were Dr. R. J. Rowlette, T.D., Dr. J. P. Shanley, and Dr. P. MacCarvill. It was pointed out to the Minister that the conditions concerning pensions for medical officers were not satisfactory. The pension given to a medical officer represented a much lower proportion to his salary than was the case with an officer in other branches of the Army. There was no reason for such discrimination against the medical service. Again, the rank of the head of the medical service was that of major, a rank lower than that held by the heads of the other branches. When the National Army was established the first medical head held the rank of major-general; on his retirement his successor was given the rank of colonel; since then the rank had been that of major. The deputation suggested too that the head of the medical service should be a member of the Army Council, in view of the fact that the work for which he was responsible was of primary importance, and was so highly technical that it could not be properly represented by a non-medical officer. The deputation impressed on the Minister that they had no wish to embarrass him, but they believed that he would be helped by occasional consultation with representatives of the medical profession. He promised to study the points that had been put before him.

CORRESPONDENCE

SAFE MILK

To the Editor of THE LANCET

SIR,—May I, as a milk-producer, comment on the memorandum on the milk-supply which appeared in your issue of April 7th over the signatures of a number of distinguished professional men? Anyone with inside knowledge of the milk industry must, unless he is blinded by prejudice and a hopeless reactionary, agree whole-heartedly with most of its conclusions and recommendations, but the condemnation of Certified and Grade A (Tuberculin-Tested) milk is somewhat disheartening to those who, like myself, have devoted much thought and hard work in the endeavour to produce a "safe" milk. For years we have been lectured about tuberculosis and the menace to human beings from bovine sources, and urged to free our herds from tuberculosis; and now, having done that, we are told that our milk is still not safe. I am not seeking to excuse the producer of dirty milk, but I ask—is there any foodstuff which can be regarded as absolutely fool-proof and safe? Occasional cases of milk-borne disease there have always been; but I seem to remember outbreaks of poisoning from meat pies, and even water has not altogether a clean record. Five hundred cases per annum of undulant fever, a disease of recent discovery and not very serious I believe, seem insignificant in proportion to the millions of gallons of milk consumed in the same period. Whatever one eats or drinks, one must take some risk. I cannot remember any doctors jibbing at the oysters on occasions when I have been privileged to dine in their company, though I certainly knew one who always cut all the crust off his bread and had his strawberries washed in a weak solution of permanganate of potash. One wonders whether doctors are not going a little too far with their hair-raising stories about milk. However, be that as it may, I am not one of the reactionary farmers who would argue the point and say that milk production to-day is perfect, and I am not qualified to discuss the merits of pasteurisation from the medical point of view. I want to work with the doctors all the time and do whatever I can to fall in with their views, if they on their part will help those of us who are trying to improve the milk-supply, and give us some guarantee they will not change their minds too soon.

As things are at present, the producers of Certified milk cannot pasteurise—the Minister of Health will not let us—but if the doctors can persuade the Minister to alter the regulations, I, for one, will certainly pasteurise for those who want it. There is no mention in the memorandum of palatability or vitamins. Many milk drinkers dislike the peculiar flavour imparted by pasteurisation, and I think that they might be allowed, after due warning of the awful fate in store for them, to take the risk of drinking their milk raw, provided the milk is of T.T. *origin* and produced under satisfactory conditions of cleanliness. And—are vitamins out of fashion? One knows that fashions change, in medicine presumably as in other spheres. It does not seem long since the doctors were stressing the importance of vitamins; but now, apparently, their importance is quite secondary.

But if we farmers are to coöperate with the doctors, it is only fair to ask that there should be some measure of agreement in the profession, and also that some steps should be taken to impress on doctors the desirability of acquiring some knowledge of milk production and distribution and the various regulations affecting the same. In my own experience of producing and selling the highest grade of milk I have come in contact with many doctors. From some I have had unstinted praise for my efforts, some have helped by recommending my milk to their patients, and some have even gone so far as to buy it for use in their own households. Still more have recommended it to their patients but have not taken it themselves, and I could fill more space than you, Sir, are likely to allow me with a recital of their various reasons for not doing so—especially the married ones. The majority do not seem to be interested at all, and display an ignorance of the whole question which is appalling in persons having their responsibilities. I venture to say that 75 per cent. of general practitioners do not know anything at all about either the Milk and Dairies Order or the Milk (Special Designations) Order, and 50 per cent. are still under the impression that Grade A milk is the highest obtainable grade.

It is a matter of regret that the memorandum deals almost entirely with milk production, and the question of contamination in distribution is ignored. In particular, one seeks for a condemnation of the out-of-date and filthy system of distribution by means of the open pail—even some of the doctors still have their milk ladled out on the back doorstep next to the ash-bin, the operation, in all probability, being performed by an unhygienic youth smoking a cigarette, and whose use of the pocket handkerchief is neither as frequent nor as thorough as the fastidious might consider desirable. But the poor farmer gets the blame for the septic sore-throat every time, and some of us who are really trying are apt to get a bit disheartened.—I am, Sir, yours faithfully,

Woolow, Buxton, April 14th. HAROLD C. LINGS.

THE PREVENTION OF CANCER

To the Editor of THE LANCET

SIR,—Dr. Cramer's paper in your issue of Jan. 6th marks a new start for the campaign against cancer. It embodies features which are essential for further progress towards control of this disease in man. The first of these is the shifting of the centre of cancer research from the laboratory and animal house to the community of man all over the world. I am not at all ungrateful to animal cancer experimenters; indeed, I believe they have established many important facts. But animal experiments with practical results applicable to cancer in man are few and far between.

A second promising feature of Dr. Cramer's paper is that he is trying to draw practical inferences from what is known about cancer in man. There are many observations, I believe, whose potential significance has not yet been fully explored; for example, the fact that a single cancer appears in a wide precancerous lesion; the fact that multiple primary cancers may originate simultaneously; and the genetic relation between the cells of the primary cancer and their host as emphasised by E. F. Bashford in 1911.

Dr. Cramer says that "a diminished frequency would indicate that the development of cancer in one site increases the resistance to the development of cancer in other sites, and thus protects against a subsequent carcinogenesis in other tissues and organs. Such a result would suggest obvious possibilities." Dr. J. A. Murray, in 1923, hinted at the same thing when he spoke of "a systemic constitutional change in the organism in which cancer has developed, a change which, if it could be recognised with certainty and rapidity, would enable us to recognise cancer in its earliest stages, and could we produce it without initiating new growth, would place in our hands a rational means of prevention" (Imper. Cancer Research Fund, 8th Scient. Rep.). Again, Sampson Handley in his book the "Genesis of Cancer" (1931) says: "It would seem that the explosion of one carcinoma nearly always inhibits the development of others by some biochemical process of which we are in ignorance.' And later he adds: "From the observation of Dukes that intestinal polypi tend to disappear after the appearance of a carcinoma, it would seem that this inhibitory power of a carcinoma is exerted also over papillomata." My own observations on the bilharzial cancer of the bladder, which is the commonest form of cancer met with in our post-mortem material, are in line with these statements. Although the bladder may present many bilharzial lesions, the cancerous process starts in one place only, and never in such bladders have I seen elevated papillomata associated with a declared carcinoma.

Analysing these facts, and inspired by Murray's writings, I argued that in order to prevent cancer it may be necessary to induce in the somatic epithelial cells of the normal person a biological state similar to that which is forced on them by the presence of a primary cancer. One way of doing this would be by artificially producing an anatomical association resembling that which obtains between a host and his primary cancer. This might be achieved by subcutaneously inoculating the normal person with living human cells which bear to him a relation similar to that which the cells of the primary cancer bear to their host. A source of such living human cells, I suggest, would be the fresh umbilical cord of a new-born child of the person in question, the covering of the umbilical cord being epithelium which is continuous at the umbilicus with that of the skin of the fœtus. Later the blood-cells of the offspring, injected into the parent, might suffice to maintain the desired inhibition.

The idea is that by inoculating a normal person with a living new generation of epithelial cells genetically related to him, we may imitate the biological state produced in man by the presence of a primary cancer in his body, and thereby protect him against subsequent carcinogenesis. In other words, we may thus succeed in diminishing the "intrinsic factor." It is obvious, however, that a very strong stimulus would always overcome an induced inhibition of this kind, and to any who may be inclined to test the effect of inoculating animals with living epithelial cells from their offspring I would like to suggest that the method should be tried as a means of preventing spontaneous cancer in normal animals and in strains of animals of various degrees of susceptibility and not as a protection against the initiation of cancer by highly potent carcinogenic agents. Such agents luckily are not in operation in human cancer of man, and in biological experiments we should imitate natural circumstances so far as we can.

The idea of preventive inoculation with a new generation of related living cells may, if accepted, open up a new field of experiment bearing more closely on human cancer than the work which has been done on resistance to transplanted tumours. Though very interesting, the results of such transplantation are obviously not applicable to man. The fact that resistance to transplantable tumours can be induced by inoculating an animal with normal tissues, such as living embryonic skin or living blood-cells or living placenta cells or living spleen cells of the same species, shows that tumour tissue when it produces a similar resistance acts in its capacity as a tissue and not as a mysterious thing called cancer. Again, the experiments done with autologous and homologous transplants have established the specific biological individuality of each organism, each one differing even from others of its own species. Cancer in man therefore should be considered not only as species-specific but also as individually specific—perhaps more so than in animals in which random mating obtains. The living cells of the progeny are, mathematically speaking, only half genetically related to their father and mother, but they are the only living new generation of genetically related cells that we can possibly lay hands on for a normal individual.

Thirdly, Dr. Cramer bids us no longer pay too much attention to what he calls "the nature of the intimate cellular change which transforms the normal cell into a malignant one." "Even if we did possess a knowledge of this change," he says, "it by no means follows that this would enable us to identify the external conditions which bring it about." This advice, I believe, is well founded—especially since we already know the following facts:—

(1) Cancer in man originates from an epithelial tissue that has been responding by proliferation to a stimulating irritation for a time long enough to be an appreciable fraction of a lifetime.

(2) Such long-standing irritation is always accompanied by important changes in the subepithelial connective tissue, and these are such that they interfere with the nutrition, oxygenation, and drainage of the superjacent epithelium.

(3) Whether or not the cells of this epithelium are directly injured by irritation, their circumstances are those most likely to bring on exhaustion and senescence.

(4) Senescence *in a living community of cells is* the signal for the formation of rejuvenated cells.

(5) Under normal conditions rejuvenated cells are made by an exchange of nuclear material between two senescent cells. No senescent cell can be rejuvenated from its own resources so long as it remains in the medium which brought about its senescence.

(6) Rejuvenation in nature is accomplished, in most of the well-studied forms of life, either by conjugation or fertilisation.

As I have suggested in a previous letter (THE LANCET, 1932, ii., 421) I believe we are justified in thinking that such a process of rejuvenation is responsible for the formation of "the cell" which *forms the germ of a primary cancer.* This origin would explain the phenomena both of spontaneous and experimental cancer in man and animals; and it provides the genetic relation between the individual and his primary cancer. I urge that we may, for the moment, rest content with this theory of the origin of the primary cancer, based, as it is, on strong analogy.

The chromosome complex of the somatic epithelial cells is identical with that of the primordial cells of the gonads; even the sex chromosomes are present, as was shown by H. M. Evans and O. Swezy in 1929. The somatic epithelial cells are living units, and if a community of them become depressed and senescent, rejuvenation should take place as it does in other living communities. Nature does not double her methods.—I am, Sir, yours faithfully,

M. F. SOROUR,
Medical Faculty, Cairo. Assistant Professor of Pathology.

GALL-STONES AND CARDIAC PAIN

To the Editor of THE LANCET

SIR,—Perhaps it is less unpermissible in medicine than in any other subject to inflict upon others one's personal experiences. The leading article in THE LANCET of April 14th on gall-stones and cardiac pain will perhaps be considered a sufficient excuse for this letter.

When a student at St. Mary's Hospital aged 23 years I had the honour of being reported in THE LANCET as a remarkable example of recovery from a very severe acute ulcerative colitis, owing my life to the skill of Sir William Broadbent, Dr. Sidney Phillips, and Dr. H. A. Caley, and to splendid nursing. This I mention because I believe this illness to have been probably the original cause for a subsequent cholecystectomy in 1931 for impaction of gall-stones in the cystic duct. This latter condition was a very puzzling one, without any violent pain, vomiting, or, as is frequently the case, jaundice. Eventually when examining at Glasgow I found a tumour which overnight felt like a growth in the bowel. The next morning it had quite disappeared, and having no desire to have fragments of my bowel excised I concentrated my mind upon the candidates. When later I asked kindly colleagues to find the tumour it had always disappeared, and certain other symptoms made the diagnosis vacillate between hysteria and coronary thrombosis. The tumour at last decided to stay long enough for Dr. C. Bolton and Mr. Gwynne Williams to confirm my diagnosis of its erratic existence, and at my request Mr. Williams cut it out with complete success. It was a strange-looking gall-bladder, I was told, with two impacted stones in the cystic duct.

For years at intervals I had had some rather horrible attacks, and later they could be divided into two types. The first consisted in waking at night with a strange feeling of what I would call an "internal sinister silence" allied to the feeling that you would expect when, having heard a stealthy step in the dark, you waited expecting to feel a dagger stuck into your heart. Then began a boring pain in the back and a steady progressive sensation of distension which in bad attacks made one feel one would burst. The pain was not acute but the general discomfort very great. The other type was of the anginal variety so well described by E. Doumer and quoted in your leading article. There occurred a sudden intense sense of impending dissolution. It was not painful, and only once or twice did a start of pain or numbness run down to the left elbow. I had many attacks and they were most interesting, when they were over, because they came on quite unexpectedly. One, for example, occurred when I was alone in my laboratory and had just picked up my hat to leave. I exclaimed involuntarily "It's all up," and yet ten minutes later walked down the stairs quite comfortably. The other was more embarrassing and occurred while I was examining in pathology for the M.R.C.P. A candidate had just commenced examining a specimen and fortunately the Bedell of the College had come into the room. The attack was gradual and gave me time to reach him, and I said "fetch me a wineglass of neat brandy." He did, and I drank it down and am not aware that I showed more ignorance of pathology after the attack than I had before. I got to learn thoroughly what a wonderful description that is "a sense of impending dissolution."

Nearly three years have passed since the cholecystectomy and I have never had another attack of this kind. Exertion never brought them on and I can still play a minus 20 grade game of tennis or golf; even when they were occurring I could play a game of cricket without the slightest threatening of an attack. Should any of my friends the cardiologists happen to slip off the heart on to the gall-bladder I can hear them say, "What about your T wave?" I confess I object to my T wave being questioned. If it is depressed then I might be depressed, and I much prefer my memories of the alcoholic wave to any memory of my T wave. What I can say now is that I do not live upon neat brandy, though no remedy equalled it for those attacks. I have been able without disaster to do the duties of a physician to two hospitals for two and a half years since the operation, to continue examining and disturbing the peace of others with written articles on various subjects. I can also say that up to this moment the attacks have ceased and, if anything, I can take stairs better than four years ago, and increasingly better.

As far as direct personal observation is of value I am convinced that there was a mysterious relation between the condition of the gall-bladder with its vagal and sympathetic innervation and the anginal type of my symptoms, because since Mr. Gwynne Williams cut off the poor relation these strange attacks have ceased, and I have done nothing to prevent their recurrence except to decide that without a gall-bladder it is well not to eat hot fat or a large dinner. I am, Sir, yours faithfully,

Harley-street, W., April 16th. F. JOHN POYNTON.

MALNUTRITION

To the Editor of THE LANCET

SIR,—At a recent meeting in London several members of the medical profession found themselves in general agreement on the following points:—

1. That there exists in this country widespread under-nourishment among the families of unemployed and low-paid workers.
2. That this must inevitably lead to a steady deterioration in the physical standards and health of the population; and of this deterioration there are already signs.
3. The last thing upon which a community must economise is the nutrition of its working class.

We are perfectly aware that the nutritional standards of the working class can only be maintained and improved by an increase, often a considerable increase, in the scale of wages and relief, and by an extension of such services as school feeding and the provision of milk and meals at clinics, &c. Demands of this kind are constantly made by organised labour; and these demands frequently resolve themselves, in our opinion, into a claim for sufficient and proper nourishment. It is not our business collectively to initiate such demands and campaigns. But we do consider it our business to give the widest publicity to the facts as we know them, and to place our material at the disposal of any individual or organisation that wishes honestly to combat malnutrition.

A committee has been established, to be called the Committee Against Malnutrition. Its aim is solely that of giving numbers of persons throughout the country the opportunity of centralising their information and coördinating all efforts to one end—the securing of adequate nourishment for every man, woman, and child. We invite all members of the medical profession, scientific and social workers, who agree generally with our three premises, to become associates of the committee. Subscriptions are fixed at 5s. a year (to entitle associates to the bi-monthly bulletin of the committee), such subscriptions covering no more than postage and the purchase of reports, journals, &c., necessary for the committee's work. The committee is undertaking the following work; and associates, where they themselves desire it, are invited to participate.

(1) Publication of bi-monthly bulletin of extracts from the recent reports, publications, &c., sociological and political notes on public nutrition. To this bulletin associates are invited to contribute. (2) Articles and letters to the press, national and provincial, on the subject of malnutrition. (3) Publication of pamphlets and books and assistance to all suitable organisations desirous of issuing such pamphlets. (4) Lectures to such organisations as teachers' groups, religious bodies, coöperative guilds, trade-union branches, and so forth, and the supply of notes to any who wish to lecture. (5) Suitable support to any direct campaigns for increase of food standards—e.g., for free school feeding for families of unemployed workers, provision of free milk at clinics, meals at nursery schools, scales of relief adequate to supply full nourishment, and so forth.

It is not intended to publish any list of associates, but the committee will always be pleased to put associates into touch with one another and with interested organisations. Those who wish to apply for associateship, or who desire further information, are invited to write to the bureau secretary, F. Le Gros Clark, 19c, Eagle-street, Holborn, London, W.C. 1. On behalf of the committee,

We are, Sir, yours faithfully,

HELEN M. JARDINE, M.B., M.M.S.A.
AUDREY E. RUSSELL, M.B.
FRANCIS LOUIS, F.R.C.S.
SAMUEL LEFF, M.B.
F. LE GROS CLARK, B.A.

THE BLOOD-BRAIN BARRIER IN INFECTIOUS DISEASES

To the Editor of THE LANCET

SIR,—In the valuable paper on this subject by Dr. Friedemann and Dr. Elkeles, published in THE LANCET for April 7th and 14th, there occur two statements which cause me no little surprise. The first, which is repeated in different words more than once, is that "the current opinion [is] . . . that death in diphtheria is due to poisoning of brain centres" (p. 720). Now, whatever may have been the teaching in Berlin and other places abroad, I can safely state that such a view has not been held in the British Isles by any teacher whose clinical experience of diphtheria has been at all extensive. The changes that have been observed, and rarely observed, by microscopical examination of the brain in human diphtheria have been regarded by clinical observers as of little or no significance in respect of the symptoms and course of the disease. Cerebral symptoms are very rare in diphtheria.

The other statement is that "the pathological changes of the vascular system have *now* become the central problem in the pathogenesis of diphtheria" (p. 777; the italics are mine). Again, that may be so in Berlin and elsewhere. But the primary importance of these changes has been recognised in this country for many years. Fourteen years ago Dr. Esther Harding published her book, alluded to by Dr. Friedemann and Dr. Elkeles, "The Circulatory Failure in Diphtheria," a work in my opinion of the highest value, and the more so because the conclusions Dr. Harding arrived at were the result of careful clinical observation of the disease in the human being. Lastly, may I be permitted to say that several years ago I wrote as follows: "The most important of the effects produced by the toxin of diphtheria are those which are to be observed in the circulation" ("A Text Book of Infectious Diseases," 1928, p. 163). Following Dr. Biernacki, Dr. Harding and others, and as the outcome of my own experience, I pointed out that the circulatory changes were chiefly peripheral.

I am, Sir, yours faithfully,

Hampstead, April 14th. E. W. GOODALL.

To the Editor of THE LANCET

SIR,—It is very difficult to reconcile Drs. Friedemann and Elkeles' views on the permeability of blood-brain barrier to diphtheria toxin with Kramer's work on ultra-filtration (*Jour. Gen. Physiol.*, 1926, ix., 811). He showed that colloidal dyestuffs would only pass through a filter with the same charge. As all the present available evidence suggests that animal or vegetable membranes in neutral aqueous solution possess a negative charge, one would expect that, if the diphtheria toxin persists in the blood as a negatively charged colloid, it would pass through the capillary barrier, but Drs. Friedemann and Elkeles show that it does not. It has long been known that diphtheria toxin at the pH of the body fluid is an anion (Field and Teague, 1907), but what we do not know is what change the toxin undergoes in vivo after the characteristic incubation period. Some change must occur in the toxin in vivo to render it toxic. Drs. Friedemann and Elkeles' illustration of acid and basic dyes is not exactly comparable, as the negative anions of these acid dyes remain non-toxic and do not become toxic after an incubation period like diphtheria toxin. It is also known that diphtheria toxin rapidly disappears from the circulation and does not circulate unchanged for days as Germanin does. One would expect any colloid micelle or polyvalent metallic kation carrying a positive charge in vitro to be immediately toxic, owing to their powerful property of flocculating the negatively charged colloidal micelles of the organism in the blood or by their similar effects in destroying the capillary membrane, thus rendering them permeable to the toxin. The effect of the diphtheria toxin is more like that of some of the complex metallic compounds recently introduced into medicine (Allochrysine, Thiobismol, &c.) where the metal is a part of the complex anion. In these compounds the toxic heavy metal effects do not show themselves until after a long interval, presumably because of the ultimate decomposition of the complex anion with liberation of a positively charged metallic ion.

The writer has suggested that the ultimate effect of diphtheria toxin resembles that of a positively charged colloid (Med. Officer, Jan. 24th, 1931), owing to the resemblance of its effects to that of the absorption of polyvalent metallic kations (Pb, Hg, Au, Br, Sn, &c.)—namely, vomiting, albuminuria, circulatory failure, and late paralysis. The experimental evidence supporting this view was based on observations of certain colloid changes observed in the particles, probably lipoidal, rendered visible in the serum by dark-ground illumination. I showed that the injection of 20 per cent. of intravenous glucose (a reducing agent, or agent capable of donating electrons) and the administration of large doses of alkalis, which tend to alter the pH of the blood in an alkaline direction, and iodine, a foreign anion, had a beneficial effect in the prevention and treatment of the circulatory failure of diphtheria and the reduction of the percentage of severe late paralysis. If Drs. Friedemann and Elkeles' views are right, these agents should make the patient worse. Our methods have been used on 3200 cases of diphtheria with a death-rate of 2·9 per cent., although many hypertoxic cases are still occurring in Bristol. These results would seem to support our views.

I am, Sir, yours faithfully,
B. A. PETERS, M.D. Cantab.

Ham Green Hospital and Sanatorium, April 17th.

HUMAN BLOOD-SERUM FOR SEPTICÆMIA

To the Editor of THE LANCET

SIR,—In reference to the contribution by Dr. Lazarus-Barlow and Dr. Chamberlain on the value of human blood-serum in septicæmia, which appears in THE LANCET of March 10th, one is led to infer that the authors are not acquainted with the previous literature on the subject. In a paper entitled "Complement in Health and Disease" (Canad. Med. Assoc. Jour., April, 1926), the use of human blood-serum in septicæmia is described and experimental evidence submitted why it should be used in these cases. The subject was amplified in two further papers, "A Method of Serum Therapy for Septicæmia" (ibid., July, 1928), and "Some Immunological Problems in Septicæmia" (Brit. Med. Jour., Sept. 20th, 1930). References to the method described in these papers have appeared at intervals in THE LANCET and other journals, and in a thorough discussion of the special methods adopted in treating septicæmia (Jour. Lab. and Clin. Med., April, 1931) Dr. J. A. Kolmer reviews this specific method.

The favourable results noted by Dr. Lazarus-Barlow and Dr. Chamberlain are in agreement with the beneficial results noted in a more extensive series of cases and described in the above-mentioned papers.

I am, Sir, yours faithfully,

Winnipeg, March 29th. FRED T. CADHAM.

TOBACCO SMOKING AND DUODENAL ULCER

To the Editor of THE LANCET

SIR,—Referring to Dr. O. A. Trowell's inquiry (published in your last issue, p. 808) into the relation of tobacco smoking to the incidence of chronic duodenal ulcer, it appears that a factor of some consequence has been ignored. The smoker of cigarettes swallows tobacco dust with his saliva and an infusion of tobacco is brewed in his stomach. If he has taken food recently the poisons in the infusion are diluted and to some extent they are decomposed into simpler and less harmful compounds by the digestive juices. Cigarette smoking before breakfast is particularly hurtful because the infusion is concentrated and poisons the gastric mucosa to such an extent that there is some paralysis of the cells which secrete the digestive juices. There follows little digestion of the poisonous infusion and impaired digestion of the succeeding meal.

I should like to see the whole question reopened with full statistical honours and with special reference to the relation of cigarette smoking before breakfast to the incidence of chronic duodenal ulcer.

I am, Sir, yours faithfully,

London, S.W., April 15th. S. G. ASKEY.

*** We regret that in some copies of the issue two figures dropped out of Dr. Trowell's Table II. The standard deviation to the average 12·0 cigarettes per day should read ±0·82.—ED. L.

HYPNOTISM

To the Editor of THE LANCET

SIR,—In your notice of my last book, "Hypnotism—the Friend of Man," you stated that I have therein represented hypnotism as an "universal panacea." In the first article which I wrote (after nine years' investigation and experimentation) on hypnotism, I remarked: "To pretend to cure all, or nearly all, complaints by hypnotism is sheer quackery" (Weekly Times and Echo, Oct. 29th, 1911). In my book entitled "Rational Hypnotism" (published in 1914) I stressed the same fact; and in "Hypnotism—the Friend of Man" I wrote: "There are some cases wherein hypnotism, even if backed by the most skilful of other treatment, is powerless, or only of use for the alleviation of coincident and aggravating troubles." What I claimed especially with regard to hypnotism is that, in view of the mental factor in complaints, "there are extremely few cases of disease or disability in which the employment of hypnotism is counter-indicated." And therein I had the support of various leading qualified practitioners.

I am, Sir, yours faithfully,
J. LOUIS ORTON.

Hawthorn Drive, Uxbridge, April 12th.

*** Mr. Orton's quotation gives the clue to our reviewer's remark.—ED. L.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

THE following appointment has been made: Surg. Comdr. N. A. H. Barlow to *Victory*, for R.N.B.

ROYAL NAVAL VOLUNTEER RESERVE

Proby. Surg. Lt. P. C. Lewis to be Surg. Lt.
Surg. Sub-Lt. G. F. Jones to be Surg. Lt.

ARMY MEDICAL SERVICE

Col. C. D. Myles, late R.A.M.C., retires on retd. pay.
Lt.-Col. & Bt. Col. G. S. Wallace, from R.A.M.C., to be Col.

ROYAL ARMY MEDICAL CORPS

Maj. R. C. Paris to be Lt.-Col.
Maj. & Bt. Lt.-Col. O. W. McSheehy to be Lt.-Col.

TERRITORIAL ARMY

Capt. J. K. Rennie resigns his commn. and retains his rank, with permission to wear the prescribed uniform.

ROYAL AIR FORCE

Flight Lt. T. V. O'Brien is promoted to the rank of Squadron Leader.

Flying Offr. W. Hall is promoted to the rank of Flight Lt.

Dental Branch.—Flying Offr. V. H. Weeks is promoted to the rank of Flight Lt.

CHARING CROSS HOSPITAL.—The report for 1933 states that the expenditure had, by rigid economy, been reduced from £67,674 to £66,590. The income was £71,877. There was a considerable increase in out-patients and casualty cases—the former exceeded 95,000; the latter numbered nearly 40,000. There were 5259 in-patients, and 2951 major operations were performed. The immediate programme comprises, besides the erection of another block of the nurses' hostel at Hampstead, the provision of paying wards in the hospital, the removal of the kitchens from the basement to the top floor, and the conversion of the basement for the use of physicians, surgeons, and specialists. At the recent annual meeting Mr. George Verity, the chairman, stated that the first step in the programme was made possible by the munificent generosity of the vice-chairman, Mr. J. S. Elias.

OBITUARY

FRANCES MAY DICKINSON BERRY, M.D., B.S. Lond.

We regret to announce the death of Lady Berry, the wife of Sir James Berry, F.R.C.S., which occurred on Sunday, April 15th, at her home, Bramblebury, near Wendover.

Dr. Frances May Dickinson Berry was the daughter of Mr. Sebastian Dickinson, formerly M.P. for Stroud, and the sister of Sir Willoughby (now Lord) Dickinson. Born in 1857 she was educated at home, save for one year in Dresden, and studied medicine at the School of Medicine for Women attached to the Royal Free Hospital. She graduated with the M.B. degree in 1889, and two years later married Mr. (now Sir) James Berry. In 1892 she proceeded to the M.D. degree, and after post-graduate work in Vienna held resident appointments at the Belgrave Hospital for Children and the New Hospital for Women. In 1895 she took the B.S. degree, with honours, and for a time was assistant medical officer for education purposes to the London County Council. She then decided to practise as an anæsthetist, and held appointments as anæsthetist at the Royal Free Hospital and the Alexandra Hospital for Children.

LADY BERRY

[Photograph by Elliott and Fry.

The war brought Sir James Berry and his wife into well-deserved prominence for their distinguished Red Cross work in Serbia. Both of them had been for years keen travellers, and their annual holidays had been spent bicycling in, among European countries, Serbia, Dalmatia, and the Danubian districts, as well as in North Africa. When, therefore, the Royal Free Hospital established a Red Cross Unit in Serbia they were especially fitted by acquaintance with the country and with the manners of the inhabitants to take charge of the adventure. The experiences in surgery and epidemiology with which the Anglo-Serbian Hospital Unit met were various, and the practical difficulties to be surmounted were great. The story was later set out in a book by Lady Berry and her husband, with the assistance of other members of the Unit, where beneath the picture drawn we discern the courage and resourcefulness shown by the leaders. The Anglo-Serbian Unit arrived in Serbia in 1915 and found that their first work would be to instil some rudiments of hygienic method into the minds of the people, who were, as the authors said, "living on mud floors, disliking fresh air, suffering much from tuberculosis and diphtheria, careless about water-supply, and horribly tormented with worms." Into such a population, already suffering from war and imminently threatened with invasion, it was a great exploit to introduce the doctrines of sanitation. There was, however, at first little fighting, and early successes had resulted in Austrian prisoners. The work of these in collaboration with that of the Serbians led to the establishment of a rough-and-ready system of hygiene, as can be gathered from the book which gave a cheerful picture of an experiment in international amity. But within a year the Austrian invasion proved victorious and the Anglo-Serbian Hospital Unit was captured. Berry and his wife were treated with great consideration and subsequently took a British Red Cross Unit to Rumania, where their work again testified to their energy and enthusiasm.

At the end of the war Lady Berry for a time resumed her professional activities, while she served as president of the Medical Women's Federation, but of late years she and her husband have lived in retirement at their house near Wendover. She had been ailing for some two months, but latterly had manifested improvement. At the end of last week she had a sudden relapse, and died of pneumonia within 48 hours.

CECIL WILLIAM CUNNINGTON, M.R.C.S., D.P.H. Camb.

The death is announced at his residence in Kilburn of Dr. Cecil William Cunnington, a well-known practitioner in the Hampstead and Kilburn districts. Born in 1855 he received his medical training at King's College Hospital, where he was a successful student and Warneford Scholar, and became an Associate of the College. He passed the intermediate M.B. Lond. examination, but went no further towards graduation, taking the M.R.C.S. Eng. in 1883. He held various resident appointments, and was for a time house surgeon at the Royal Free Hospital, and some forty years ago commenced practice in the neighbourhood where he died. Dr. Cunnington's local activities were great. He early became a member of the Hampstead vestry, secured a seat on the borough council on its formation, and later became an alderman. He served on many district committees, showing special interest not only in hygienic matters but in the maintenance of libraries and the preservation of open spaces. The public concern at his death was displayed by the large congregation assembled at the funeral.

THE LATE DR. STANLEY MELVILLE

Dr. Arthur G. Phear writes: "May I be allowed to supplement your memoir of Stanley Melville by a reference to his love of flowers, gardens, and music? On the occasions of our visits to the Royal National Hospital at Ventnor it has been my privilege to play truant with him from the business of the board room and to wander through the grounds with the gardener, who delighted in displaying his special treasures to so congenial and appreciative a companion. He was intensely devoted to music and though, owing to his disability, he was debarred from performing himself, he took a keen and critical interest in the works of the older composers, and would comment on the solace and refreshment he derived from listening to the music of Bach, specially when played on the clavichord. It may not be out of place in this connexion to pay a tribute to the exquisite music provided by the organist and boys of the choir at the memorial service at All Saints, Margaret-street. Nothing could have been more perfect in itself, or more appropriate to the occasion. Mr. Vale, the organist, was a close friend of Stanley Melville, and the singers were undoubtedly expressing a sense of personal loss."

PANEL AND CONTRACT PRACTICE

A Review of National Health Insurance

It was enterprising of the Blackburn insurance committee to ask Sir George Newman to address insurance doctors and chemists at a local celebration of 21 years of health insurance, and to make his remarks on this occasion available to a wider audience. Sir George recalled that when the Health Insurance Bill was proposed in 1910 they were told there were three fatal blemishes in it: first the scheme was too expensive to be profitable; secondly the doctors would not coöperate, and if they did they would be an inferior part of the profession whose treatment would be perfunctory and inadequate; thirdly as many of the insured persons desired to be exempted, only those would be in it who wanted something for nothing. Within 20 years these fears had proved to be substantially false. It was Emerson who said :—

> "The lesson of life is to learn to put the meaning of the centuries and of the years over against the meaning of the days and hours."

Looking back after years or centuries, said Sir George, we could see the trend of men's work. More than 800 years ago the guilds—religious, merchant and craft—were with the manors and monasteries a means of coöperative defence against physical disability. The guilds were followed by the friendly society and the trade-union, with the result that to-day we live in the Golden Age of state assistance and coöperation. Between the Feeding of School Children Act of 1906 and the Local Government Act of 1929, Parliament enacted ten measures dealing with different kinds of social insurance. In little more than a generation the public health service had turned from reform of environment to reform of personal health, in fulfilment of Edmund Burke's splendid vision, "A working partnership between those who govern and those who are governed."

From the records of sickness of 16 million insured persons we had learned that about half the working population suffer from sickness in some form during the year; that 20 per cent. of those who claim sickness benefit do so on account of bronchitis pneumonia, or other respiratory disease, 13 per cent on account of indigestion or diseases of alimentary tract, 10 per cent. on account of rheumatic troubles, and a like number of injuries, accidents, and septic wounds. These four conditions accounted for more than half of the non-infectious sickness of the English people; plus the infective diseases they constituted the common enemy of the nation, more wasteful in time, money, and life than all the industrial strikes put together. After alluding to the steady decline in disease and increase in expectation of life, Sir George spoke of the immense advantage of health insurance in removing the chief deterrent of early and effective treatment. The insurance principle was, he said, a grand system of education for the people in the art of living. It was inconceivable that eight million persons should every year seek advice from their doctor without learning something about the avoidance and prevention of sickness; the doctor inquired into causation because it paid him best for his patient not to be ill. There was of course some imperfect work—this being an imperfect world, human beings were not infallible—but taken as a whole it was a system which gave half the adult population the inestimable advantage of coöperative medicine, not only under supervision of the contracting parties, medical and lay, but so designed as to meet the needs, both real and fanciful, of the insured person.

In this interesting address Sir George Newman was no doubt right in emphasising the freedom of the insured person from financial anxiety in case of illness as one of the greatest assets of national health insurance. It is curious how little the logic of this fact is brought home to the insured population. Insurance practitioners constantly hear their patients complain that they only have the insurance money coming in to live on. Is it not rather surprising that the majority of working men seem content to insure only through the Act for its ordinary benefit, and rarely, if ever, increase the amount payable weekly through the voluntary side of the approved society.

PUBLIC HEALTH

Puerperal Sepsis

A CIRCULAR letter dated April 13th from the Ministry of Health calls the attention of medical officers of health to the discontinuance of an arrangement for the bacteriological investigation of puerperal sepsis. The Departmental Committee on Maternal Mortality was so much impressed by the number of fatal cases of puerperal sepsis in which no source of infection had been traced that it suggested immediate steps to define the responsibility of the throat carrier and of infective conditions in persons in contact with the patient. By arrangement between the Ministry of Health and the Medical Research Council the services of a full-time bacteriologist were made available and Dr. Dora Colebrook was appointed by the Council and began work on Jan. 1st, 1932, in the new laboratories of Queen Charlotte's Hospital at Hammersmith. Her results show that certain puerperal fever cases are infected by a strain of *Streptococcus pyogenes* identical with that obtained from the respiratory tract of the doctor or nurse attending them; that in other cases the infecting strain is identical with that obtained from the patient's respiratory tract; that in a third group the strain is identical with those obtained from the respiratory tract both of the patient and of a contact. Cases of the last type are not very uncommon and allow of no decision as to the source of the infecting strain. Dr. Dora Colebrook's work continues although no longer in association with the Ministry of Health.

Opening a discussion last summer at the Dublin B.M.A. meeting, Dr. Leonard Colebrook said that in a group of 57 women admitted to Queen Charlotte's for puerperal infection by *S. pyogenes*, 12 per cent. were carrying these cocci in the nose only. Available data, he said, indicated that nose carriers of hæmolytic streptococci number no less than 4 per cent. of normal individuals in London during the spring. He spoke of a nurse working in a maternity hospital where cases of puerperal sepsis had been occurring sporadically for two years. This nurse had a slight discharge from her nose after an operation on the antrum two years previously, and this discharge was full of hæmolytic streptococci. The last case of puerperal infection sent to Queen Charlotte's was found to have a strain of streptococcus identical with that from the nurse's nose. Dr. Colebrook concluded that from his experience there are many sources of streptococcal infection: it may come from the mother herself, from another septic case, or from the nose or throat of someone attending her. It is too often overlooked, he remarked, that infection may come from some member of the household who is not present at the confinement—e.g., the husband with a sore-throat or a septic wound of his hand, the child with impetigo, a discharging ear, or a post-scarlatinal nose infection. Infective material from one of these sources may have contaminated a towel used by the midwife after washing her hands.

In an earlier letter to M.O.H.'s Sir George Newman pointed out that administrative difficulties not infrequently arise from bacteriological uncertainty about the strains of streptococcus in a particular case and a number of agglutinating sera available for the purpose has been steadily accumulating. These serums are available at the Ministry of Health for the rapid identification of strains. Although the arrangement with the Medical Research Council is now to cease, the value of bacteriological investigation in the problems which confront the medical officer of health in relation to the conduct of maternity homes and the suspension of midwives is still evident. The circular letter hopes that the M.O.H. will take every opportunity to obtain assistance on these points from bacteriologists attached to adequately equipped local laboratories. The M.O.H. desirous of obtaining the help of the Ministry can still do so by forwarding a short report of the cases of infection which have occurred and the bacteriological results, if any, which have been obtained.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED APRIL 7TH, 1934

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 6 (last week 3); scarlet fever, 2613; diphtheria, 1059; enteric fever, 11; acute pneumonia (primary or influenzal), 1404; puerperal fever, 55; puerperal pyrexia, 128; cerebro-spinal fever, 26; acute poliomyelitis, 2; encephalitis lethargica, 6; dysentery, 3; ophthalmia neonatorum, 68. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on April 16th–17th was as follows: Small-pox, 1 under treatment, 7 under observation (last week 11 and 1 respectively); scarlet fever, 1651; diphtheria, 1725; measles, 3648 (last week 3670); whooping-cough, 311; puerperal fever, 30 mothers (plus 10 babies); encephalitis lethargica, 258; poliomyelitis, 4; "other diseases," 101. At St. Margaret's Hospital there were 13 babies (plus 7 mothers, with ophthalmia neonatorum).

Deaths.—In 118 great towns, including London, there was no death from small-pox, 3 (0) from enteric fever, 162 (59) from measles, 12 (0) from scarlet fever, 51 (11) from whooping-cough, 49 (15) from diphtheria, 40 (10) from diarrhœa and enteritis under two years, and 89 (21) from influenza. The figures in parentheses are those for London itself.

Measles remains substantially unchanged, the figures for the last few weeks, working backwards, being 162, 153, 187, 157, 141, 130, 119, 110, 78. This week there were 18 fatal cases in Liverpool, 14 in Middlesbrough, 9 in Newcastle-on-Tyne, 7 in West Ham, 6 in Barnsley, 4 in Salford, and Stoke-on-Trent. The deaths from measles so far during the present year number 1506, compared with 459 during a similar period last year.

Willesden, Dewsbury, and Oldham each reported one death from enteric fever. Whooping-cough caused 6 deaths in Liverpool, 5 each in Salford and Sheffield, 4 in Birmingham. Five deaths from diphtheria were reported from Liverpool. Fatal cases of influenza were widely distributed among 42 great towns, the highest number of deaths being reported from Birmingham 6, Liverpool 5, Willesden, Hastings, Portsmouth, Southampton, Newcastle-on-Tyne, Sunderland, each 3.

The number of stillbirths notified during the week was 291 (corresponding to a rate of 44 per 1000 total births), including 47 in London.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

Road Traffic Bill

MINISTER'S DEFENCE OF HIS PROPOSALS

IN the House of Commons on April 10th Mr. OLIVER STANLEY (Minister of Transport) moved the second reading of the Road Traffic Bill. He said that the problem of road accidents was one the gravity of which could not be exaggerated. He doubted, however, whether even now the general public were really alive to the terrible extent of the fatalities and accidents.

He wondered, for instance, whether the ordinary man realised that between that time (3.30 P.M.) and 11 P.M. when the Speaker would put the question that this Bill be read a second time, on the basis of the law of averages, 180 people would have met with an injury on the roads of this country.

The Bill was a proposal which the Government made for dealing, as far as any form of Statute could deal with this particular problem. There was a school of thought which said that there was no need to worry about restrictions, no need for users of the road to put up with anything, if only enough money was spent on the roads. He believed that to be dangerous nonsense. A great deal of time and ingenuity as well as money could be spent upon the roads, but in the end the roads would only be made safer, but not safe. Ignorance and folly could kill a man just as surely on a modern by-pass as on an old country road. He did not believe there was any possibility of finding any real solution of this problem unless all of them were prepared to bear burdens themselves, as well as impose burdens on others, and unless all of them were prepared in some degree to subordinate their personal convenience and desires to the general need of public security. This Bill was only a part and not necessarily by any means the most important part, of the action they would have to take if this problem of road accidents was to be solved.

The four principal proposals of the Bill, said Mr. Stanley, were a speed limit of 30 miles per hour in built-up areas, a test for new drivers, the establishment of pedestrian crossings, and amendments in the law of compulsory insurance. Looking back on the last four years they had to admit that the hopes which were then entertained of a reduction in the numbers of killed and injured on the roads had largely been falsified. Unfortunately in the last 18 months there had been unmistakable signs of a growth in the number of accidents, and because of that fact they had to survey the field once again. One heard many arguments as to speed being the important factor in accidents. Most people would agree that as a factor in accidents speed was only relative; but they must all agree that speed reduced the driver's power to deal with the unexpected. It was in the built-up areas that 75 per cent. of the deaths of pedestrians occurred. Pedestrians made up more than half of the total of people killed on the roads and about half of the pedestrians were children and old people. He asked hon. Members not to be led away by the argument that this Bill was a return to the old speed limit. This new proposal was quite different. The former speed limit failed because it did not accord with the view of reasonable people.

TESTS FOR DRIVERS

In regard to tests for drivers, it was true that a certain number of people would be unable to pass the test at all. There would be some whose physical condition would prevent them, some whose reactions were so slow and whose judgment was so bad that they were better off the roads; but the general run of people would eventually pass the test.

With regard to the machinery of the test he intended to approach at once the motor organisations. They had expressed complete hostility to this particular provision, but he would appeal to them to coöperate in setting up machinery for carrying out these tests. Of course, if they refused that was their business. There were alternative methods which could easily be adopted. The Bill gave power to the magistrates in case of a conviction for careless or dangerous driving to suspend the motorist's licence until he passed the test. Drivers of heavy vehicles would be required to obtain a special licence enabling them to drive that particular class of vehicle.

The decrease in fatal accidents as a result of the experiment of pedestrian crossings in the Department of the Seine in France had been so remarkable that he felt that he could not overlook the possibility of such an experiment in this country. As regarded the question of insurance, under the new provisions contained in the Bill the insurance company would become liable on their policy as soon as the injured person secured a judgment, if the car was being used within the terms of the policy. It would then be for the insurance company if they wished to repudiate to get the declaration from the court saying that they were entitled so to do, and they would only be able to get that declaration on the ground of non-disclosure of material facts. It shifted the onus in this case from the injured person to the insurance company.

THE PSYCHOLOGICAL ASPECT

Sir Ernest Graham-Little said he would restrict his intervention entirely to the medical and psychological aspects of the problem. The medical profession had a long experience of accidents, and while attention was confined to mechanical factors progress was slow, but when attention was directed to the human factor the improvement was immediate. It was to the neglect of the human factor in this Bill that he wished to draw attention, and he urged the Minister to realise the importance of including a medical test as well as a test of competence in driving. It was possible to make a discrimination between drivers who were likely to be mischievous and those who were not, and the tests, as was so often the case, were largely ignored in this country while they were adopted very much more widely in other countries. Their practical utility might, he thought, be conveniently gauged by some figures published two or three weeks ago in Paris by one of the most eminent psychologists in the world.

These figures showed that the frequency of accidents caused by taxis, private cars, and lorries between 1921 and 1932 increased by 145 per cent. A series of figures for the corresponding year furnished by the General Transport Company of Paris, which was responsible for the omnibuses and trams of that city, showed that the accidents due to collision were reduced by more than 30 per cent. and the gain to the company following these tests reached an average of 1,500,000 francs a year.

Somewhat similar figures were furnished in the case of some companies in America. In the Street Railway Omnibus Service of the Boston Elevated Railway accidents were reduced by 35 per cent. The figures in the case of the Milwaukee Electric Railway were reduced from 14·1 to 0·6 per cent. in a year.

The test, Sir Ernest continued, did more than reduce the rate of accidents. It sorted out the drivers who were likely to be mischievous from those who were not, and the register of selected persons fell to something like 3 per cent. where it had previously been 20 per cent. The saving in the cost of the wear and tear of vehicles again represented a very large sum. He was sure that an advance would be better made by following along the line of medical science, and he was equally sure that much of the accident-rate was caused by essential ignorance of quite simple biological facts on the part of motorists.

It was not perhaps, sufficiently realised that the time occupied in making a decision might make all the difference between a fatal accident and an escape. That was tested very carefully in a group of drivers, and it was found that the best driver gained a half per cent. as compared with the less experienced and less capable driver. That meant a saving of 30 ft. He could pull up at 30 miles an hour within a distance of 30 ft. less than the man whose reaction time was a second longer. The reaction time could be decreased. A decision could be retarded by a large number of quite innocent acts. A heavy dinner, a glass of beer, inattention, fatigue—all these unconscious factors might influence that very important circumstance.

The Bill could, he thought, be improved by paying some attention to the human factor which was aptly demonstrated by statistics to be responsible for a large proportion of accidents.

Sir Charles Oman said that there was a great deal to be said in praise of the Minister's proposed tests and examinations for motorists. He thought that the arguments produced against the proposal had been unconvincing. There was only one thing he would like to add, and that was a medical examination. Only a few weeks ago an epileptic motorist charged into a dense crowd watching the King drive away and killed four people. If that motorist had presented himself before a doctor he would probably have been detected. A person who was actually a drug-taker, or was showing signs of being a habitual drunkard, would also be detected by a medical man. The only thing that was wanted in addition to the tests proposed in the Bill was that there should not only be a test of driving but a doctor who, at the lowest possible fee, would say that the applicant for a licence was physically and mentally capable.

PAYMENT FOR EMERGENCY TREATMENT

Dr. Howitt said he welcomed the Bill because he believed that immediate legislation was necessary if the appalling casualties on the roads were to be reduced. The Minister was aware that many members of the House were anxious that the Bill should include a provision embodying the principle of Lord Moynihan's Road Traffic (Emergency Treatment) Bill which had passed through all its stages in the House of Lords. That Bill made provision for remuneration of registered medical practitioners and hospitals for emergency treatment only. Hospitals and medical men were thoroughly dissatisfied to-day with their remuneration for such emergency treatment, and their dissatisfaction was shared by people all over the country. It was not right that emergency treatment should be given by hospitals and doctors and not be paid for. Everybody would agree that family doctors were very hard-working men who were not particularly wealthy or over-paid. The lives of many of these doctors were rendered miserable to-day by casualties on the main roads. He was afraid that a lot of medical men had had to give up their houses on or near main roads because they were being perpetually called out on Sundays and were losing money, just as was the case in regard to the hospitals, in connexion with the supply of bandages and splints. They practically never got a penny of remuneration or one subsequent word of thanks. He did not think that the reason for this was sheer ingratitude on the part of the patients, but a fear of the law if they got into communication with the doctor. They feared that if they paid anything they were putting themselves in a false legal position. The difficulty was how the contribution to hospitals and medical men for emergency treatment was to be found. After a great deal of discussion the conclusion had been arrived at that a very slight increase in the premium for compulsory insurance for third-party risks would cover emergency treatment by doctors and hospitals. The cost of the extra premium would be very small.

Mr. McKeag said that Dr. Howitt had mentioned a real grievance which he felt sure that the Minister of Health would do his best to meet, and in regard to which he thought that Dr. Howitt would have the support of the majority of Members if he raised the matter in Committee.

Mr. Lovat-Fraser begged the Minister of Transport to deal with the horrible, shrieking motor-horns in use at present. He said that they were thoroughly bad for the nerves, and were becoming more numerous.

JUSTICE TO HOSPITALS

Mr. STOREY said that the greatest blot on the Bill was that it did nothing to secure justice for the voluntary hospitals, and left on their shoulders a very heavy burden due to the cost of treatment of road accidents. The Minister of Transport had reminded the House that between the time he was speaking that afternoon and 11 o'clock that night 180 persons would be injured on the roads, but he had not reminded them that those cases would be treated by the hospitals which would not be able to recover more than one-half of the cost.

The House would recall that before the 1930 Act was passed it was estimated that road accident cases cost voluntary hospitals no less than £230,000 per annum, and of that sum the hospitals were only able to recover some £26,000. The House might not realise, however, that although the 1930 Act made provision for hospitals to recover up to £25 where negligence could be proved against the driver it utterly failed in every way to do justice to the hospitals. In 1931 it was estimated that road accidents still cost the voluntary hospitals of the country £230,000, but they were only able to recover £34,000. It was true that there were outstanding claims of some £58,000, but anyone who knew how difficult it was to recover those sums would realise that such claims were very doubtful assets indeed. It was very difficult to maintain voluntary hospitals at the present time, particularly in distressed areas, where contributions were made in small sums of *1d.* or *2d.* a week from working-class people; and it was quite wrong that those who had subscribed this money should have to wait for treatment owing to the pressure on the hospitals due to road accidents.

Mr. Storey suggested that a charge should be made on the Road Fund to meet cases of this kind, and that the money should be paid to some central body which would recoup the voluntary hospitals for their charges, the hospitals making over to that body any right they might have against any driver who had been proved to be negligent. He hoped that the Minister during the Committee stage of the Bill would seize the opportunity of doing justice to the voluntary hospitals. The voluntary hospital system was an asset which this country and the House should do everything to support.

THE GOVERNMENT'S REPLY

Lieut.-Colonel HEADLAM (Parliamentary Secretary to the Ministry of Transport), replying to the debate, said there was no intention of re-establishing a general speed limit for private cars such as existed before 1921. It was, however, perfectly clear that the larger number of accidents taking place at present occurred on roads in built-up areas. So long as that was the case it was desirable to make it less likely that accidents of that kind should occur. The Government thought that by imposing a speed limit in built-up areas no serious hardship would be imposed on motorists. The real point of the Bill was not that the Government hoped by it to do away with all the accidents and troubles on the roads at present, but that its effect would be to reduce accidents and inculcate in the people of the country the necessity for care and caution on the roads. The Minister was ready to consider in Committee any suggestions by Members for the improvement of the Bill. Matters such as those concerning the hospitals and the doctors could well be considered in *Committee*.

The Budget Statement

In the House of Commons on Tuesday, April 17th, Mr. CHAMBERLAIN, Chancellor of the Exchequer, made his annual Budget statement. He said that a year ago he had to report a deficit of just over £32.000.000; this year he was able to announce a surplus of £31.147,860. The revenue receipts had exceeded the estimate by £25·8 millions. Of this Customs and Excise had contributed £17.000,000. Income-tax at £229,000.000 and surtax at £52,500.000 were within 0·7 per cent. of the estimate.

Mr. Chamberlain announced that the general preference on all colonial sugar reaching the United Kingdom would be reduced to the old rate of approximately 3*s.* 9*d.* per cwt. The additional quota preference of 1*s.* per cwt. would be replaced by a new quota preference of 3*s.* per cwt. on a fixed quantity of 360,000 tons per annum. This provision would remain in operation for three years.

As from Jan. 1st next the present motor vehicles tax of £1 per horse-power would be reduced by 25 per cent. to 15*s.* per horse-power. There would be a corresponding reduction in the duties payable on motor cycles. The cost of this reduction would be £2,200,000 in 1934–35 and £4,000,000 in a full year. Under the existing law this loss would be borne as to two-thirds by the Road Fund and as to one-third by the Exchequer. Special arrangements would be made under which the Exchequer share of the duties on private vehicles (normally one-third) would be subject this year to a minimum of £5,000,000. The fee of 10*s.* or 5*s.*, as the case might be, charged since 1924 for the surrender of licences, would be abolished.

Dealing with the manner in which he proposed to deal with the Budget surplus Mr. Chamberlain said that one-half of the cuts in salaries made in 1931 would be restored as from July 1st. Excluding the unemployed, the cost of this provision to the Exchequer in a full year would be £5,500,000, and in the current year £4,000,000. The whole of the cuts in unemployment benefit would be restored. On the assumption that the Unemployment Bill would become law by the end of June next the new rates of benefit would take effect as from July 1st next. There would be a corresponding alteration in the rates of transitional payments (where the needs of applicants required it) and £3,600,000 would be allowed for this in the current year. The cost of the restoration of the 10 per cent. cut in unemployment benefit was estimated at £4·8 millions in a full year. These proposals left a surplus of £21·3 millions.

Out of the £81,500,000 of extra taxation imposed in 1931 the income-tax payers found no less than £57,500,000, or 70 per cent. Although their burdens were already heavy, the income-tax payers had shouldered an extra 6*d.* on the standard rate of tax, there had been a general reduction in allowances, and a surtax of 10 per cent. on the larger incomes. Moreover, all these increases of taxation took effect from April, whereas the cuts only became operative in the autumn. It must not be forgotten that since 1931 many income-tax payers had also suffered a further serious reduction in their incomes owing to the operation of the conversion loan. The case for some remission was therefore overwhelming. The only question was as to what form the remission should take. In deciding the form he thought he ought to consider the effect of any remission, not merely on the individual taxpayer, but upon the country as a whole. He had come to the conclusion that the relief which would confer the most direct benefit on the country, which would have the greatest psychological effect, and which would impart the most immediate and vigorous stimulus to trade and employment, would be a reduction in the standard rate of income-tax. Accordingly he proposed to remove the 6*d.* imposed in 1931 at a cost of £20,500,000 this year and £24,000,000 in a full year.

Summarising the Budget, Mr. Chamberlain said that the final balance showed an estimated revenue for 1934–35 of £706,500.000 and an estimated expenditure of £705,700,000, leaving a prospective margin of £800,000.

HOUSE OF COMMONS

THURSDAY, APRIL 12TH

Woman's Detention in Mental Ward

Mr. PIKE asked the Minister of Health whether his attention had been called to the circumstances attending the death of Mary Hedley, aged 60 years, a married woman, of New-street, Sheffield; and if it was the intention of His Majesty's Government to institute inquiries into the operation of the Lunacy Acts with a view to ensuring that certificates declaring persons to be of unsound mind should not be issued until indisputable medical evidence had been established.—Sir HILTON YOUNG replied: There is, I think, some misapprehension about the facts of this case. It appears from the press report of it that, on the strength of a medical certificate from the district medical officer describing this woman's condition as "bronchitis and unsound mind," she was removed by the general relieving officer to the hospital under the provisions of Section 20 of the Lunacy Act with a view to her being kept under observation in the mental ward. The patient died there before any question of further formal proceedings for certification under the Lunacy Act arose and she was never certified. In these circumstances, there is no case for inquiry into the operation of the Lunacy Act.

Mr. PIKE: Does not the right hon. gentleman think that in view of the present circumstances which permit an officer of a public assistance committee to issue an order for detention in a mental ward, no person should be admitted as a mental case until there has been a thorough medical inquiry and the mental condition of the person has been established?

Sir HILTON YOUNG: I do not think I can accept the suggestion which is contained in the hon. Member's supplementary question. He will see that in this particular case there was, as a matter of fact, no question of certification.

Provision of Meals for School-children

Mr. THOMAS WILLIAMS asked the Parliamentary Secretary to the Board of Education if he would furnish a list showing those authorities which, under Sections 82 to 84 of the Education Act, 1921, provided meals, respectively, only on days when the school met, on days when the school met and Saturdays and Sundays, and on school days, Saturdays and Sundays, and during holidays.—Mr. RAMSBOTHAM replied: The answer is as follows: The preparation of a complete statement containing the information required would involve the expenditure of a disproportionate amount of time and labour. The following table gives a summary, by types of local education authority, of the periods during which school meals are provided in the different areas.

Days per week on which meals are provided.	Number of. local education authorities.			
	Counties.	Non-county boroughs.	Urban districts.	County boroughs.
7 days and holidays	—	2	—	4
7 ,, not ,,	—	—	—	1
6 ,, and ,,	1	9	7	18
6 ,, not ,,	—	—	1	—
5 ,, and ,,	4	13	8	21
5 ,, not ,,	8	23	8	16
5 ,, a week* ..	3	8	2	8
Miscellaneous case †	—	3	1	5

* In these areas it appears that feeding is not continued during the holidays, but the Board have no definite information.

† These include one county borough where breakfasts are provided on five days a week and holidays, and dinners on six days a week and holidays. In the remaining eight areas milk is given on five days a week and not in holiday periods, but other meals are provided in those areas as follows:—

2 boroughs ..	Cod-liver oil and malt and/or emulsions on	7	days a week and holidays.
1 borough ..	Ordinary meals on ..	7	
1 urban district	,, ,, ,, ..	6	
2 county boroughs	,, ,, ,, ..	5	
1 county borough	,, ,, ,, ..	6	
1 ,, ,,	,, ,, ,, ..	7	

Use of Dangerous Drugs for Slimming

Captain ERSKINE-BOLST asked the Home Secretary whether he had any information as to the time that would elapse before action was taken to place on the appropriate poisons schedule dinitro-phenols and dinitro-cresols, drugs the use of which for slimming purposes had proved fatal in several instances recently.—Sir J. GILMOUR replied: The steps necessary to add these drugs to Part I. of the existing Poisons Schedule have already been taken and notice to that effect will appear in to-morrow's *London Gazette*. The Statute requires that one month shall elapse from the date of the notice before the provision comes into effect.

India (Defence Forces' Medical Service)

Captain ELLISTON asked the Secretary to the Treasury whether he could report the result of consultations with the Government of India regarding the recommendations of the Warren Fisher Committee in reference to the Royal Army Medical Corps and other medical services of the defence forces.—Mr. HORE-BELISHA replied: Agreement has now been reached and the Government decisions on the recommendations of the Committee will be announced by the end of this month.

MONDAY APRIL 16TH

Pensions and Institutional Treatment

Mr. THORNE asked the Minister of Health if he was aware that, when a pensioner went into a hospital or institution which received grants from either the Government or the local authority in which the hospital or institution was situated, the pension inured to the State, and that no portion was paid to the local authorty or institution while the pensioner was an inmate; whether he had recently received any representations from local authorities asking for an alteration in this practice; and, if so, whether he had any intention of introducing legislation.—Mr. SHAKESPEARE (Parliamentary Secretary to the Ministry of Health) replied: As regards the first part of the question, the position is that under the provisions of the First Schedule to the Widows', Orphans' and Old Age Contributory Pensions Act, 1929, a pensioner who becomes an inmate of a poor-law institution, other than a pensioner who enters an institution for the purpose of obtaining medical or surgical treatment and continues to require such treatment, is disqualified for the receipt of a pension. There is no provision in the law for the transfer of any portion of the pension to the poor law authorities. As regards the second part of the question, I have received no representations recently in the sense suggested by the hon. Member and the last part of the question does not, therefore, arise.

Nursing Services in India

Dr. O'DONOVAN asked the Financial Secretary to the War Office if the Army Council considered British lady nurses of the Queen Alexandra's Military Nursing Service for India ineligible for appointment to the post of chief principal matron at Army headquarters, India; and if appointments to the post were to be confined, for the future, to British lady nurses of the Queen Alexandra's Imperial Military Nursing Service.—Sir S. HOARE replied: Members of both the British and the Indian nursing services are eligible for the post in question, and the appointment is made on the merits of the candidates from either service on each occasion.

TUESDAY, APRIL 17TH

Milk Tests in Scotland

Mr. LEONARD asked the Secretary of State for Scotland what action had been taken by the Scottish Milk Marketing Board to ensure that milk intended for liquid consumption should be adequately tested for the proper maintenance of a pure milk standard.—Sir GODFREY COLLINS replied: The Board have prescribed a minimum butter fat content standard of 3·4 per cent. The question of fixing a standard for cleanliness is engaging the attention of the Board.

Milk-supplies to School-children

Sir WILFRID SUGDEN asked the Parliamentary Secretary to the Board of Education the numbers of children in elementary schools in Essex and also in England and Wales who received during their attendance at school a tumbler of milk daily morning and/or afternoon; and what was the test of elimination whereby others in the same schools were not so supplied.—Mr. H. RAMSBOTHAM replied: The numbers of school-children in the geographical county of Essex, and in England and Wales as a whole, who were provided with milk by local education authorities during the month of February last, were 1363 and 184,493 respectively. In addition, it is estimated that about 21,000 school-children in the geographical county of Essex and 900,000 in England and Wales as a whole, receive milk daily under voluntary milk schemes administered by the National Milk Publicity Council. The selection of children to receive milk depends on a variety of factors, such as, for example, the condition of the child, the willingness or unwillingness of the parents to pay where able to do so, or the willingness of the parent to allow the child to receive milk.

Slum Clearance

Sir PERCY HARRIS asked the Minister of Health in how many slum-clearance schemes had the work of clearance been actually commenced for the year ended March 31st, 1934, or the nearest available date; and how many persons therefrom had been actually rehoused.—Sir E. HILTON YOUNG replied: The number of clearance schemes, that is, confirmed orders or purchases by agreement in the course of the year ended March 31st last was 631, involving the demolition of 16,375 houses and the building of replacement houses for 73,718 persons, but I am not able to state the extent to which the work of clearance and rehousing had gone by the end of the year.

Disposal of London Refuse

Mr. MCENTEE asked the Minister of Health whether the advisory committee on London refuse had finished their work and reported; and, if so, would he state the nature of their report.—Sir E. HILTON YOUNG replied: I understand that the committee have completed their inspection of places where refuse is handled in the county, or disposed of outside the county, and also their inquiry into the collection and disposal of house refuse and the cleansing of streets and gullies in all but one of the city and metropolitan borough councils; and that the committee hope shortly to be able to submit a report in the first place with regard to the disposal of London refuse.

Health Insurance: Medical Benefit

Mr. THORNE asked the Minister of Health if he could state, owing to continued unemployment, at the end of December, 1933, the numbers of persons that had been denied medical benefit from their various approved societies.—Sir E. HILTON YOUNG replied: The returns which have now been received from approved societies indicate that the number of members who after a period of prolonged unemployment were continued in insurance during 1933 by virtue of section 1 (5) of the National Health and Contributory Pensions Act, 1932, but ceased to be entitled to medical benefit on 31st December last (though continuing to be insured for pensions purposes) is approximately 125,000. This number will, however, be substantially reduced by reinstatements to medical benefit, notifications of which are now being received from societies at the rate of several hundreds a week.

Small-pox at Blackburn

Mr. GROVES *asked the Minister of Health whether the* medical officers of the Ministry reported the form of small-pox recently notified at Blackburn to have been of the variola major or the variola minor type.—Sir HILTON YOUNG replied: I am advised that the recent outbreak of small-pox in Blackburn was an outbreak of variola major.

Mr. GROVES asked the Minister of Health how many cases of small-pox were wrongly diagnosed in connexion with the recent outbreak at Blackburn; and whether it was proposed to take proceedings against the medical attendant or attendants concerned for failing to notify these cases as small-pox.—Sir HILTON YOUNG replied: Four of the early cases were originally diagnosed as chicken-pox. The answer to the second part of the question is in the negative. An error in diagnosis does not constitute an offence under the Infectious Disease (Notification) Acts.

Mr. GROVES asked the Minister of Health whether he was aware that the first case which led to the recent outbreak of small-pox at Blackburn was a man employed at a cotton-mill where he handled cotton daily; and whether the evidence indicated that he contracted the disease in the performance of his duties.—Sir HILTON YOUNG replied: The answer to the first part of the question is in the affirmative. I have no satisfactory evidence on the second part.

MEDICAL NEWS

Royal College of Surgeons of England

At a meeting of the council held on April 12th, with Sir Holburt Waring, the president, in the chair, the Jacksonian prize for 1933 was awarded to Mr. Edgar Samuel John King, F.R.C.S., of Melbourne Hospital and Melbourne University, for his essay on the pathology, diagnosis, and treatment of localised rarefying changes in bones. A certificate of honourable mention for an essay on the same subject was awarded to Mr. H. Jackson Burrows, F.R.C.S., of St. Bartholomew's Hospital. The Jacksonian prize subject for 1934 is the pathology, diagnosis, and surgical treatment of the various forms of splenomegaly, and for 1935 the pathology, diagnosis, and treatment of intrathoracic new growths, excluding neoplasms of the œsophagus.

The John Hunter medal, with the triennial prize for 1931–33, was awarded to Dr. Dorothy S. Russell, of the London Hospital, for her work on the morbid histology of the kidney and brain.

Dr. G. A. Buckmaster (Bristol) and Mr. G. F. Stebbing (London), being members of 20 years' standing, were elected to the fellowship. Diplomas of membership were granted to T. S. Heslop (Manchester) and M. S. Shin (University College). Diplomas in tropical medicine and hygiene were granted jointly with the Royal College of Physicians to the following:—

A. C. Banerjee, P. P. Bhavnagri, S. A. B. Black, I. E. Dirckze,
V. L. Ferguson, Emily C. Greenfield,
Mayne, K. S. Menon, T. H. L. Montge
H. A. F. Sallam, M. F. Seth, F. J. Sladen
Somers, A. L. Stuart, T. H. Williams,
and K. E. Yuill.

The regulations for examinership in anatomy were altered so that in future examiners in anatomy both for the fellowship and for the membership will be elected from persons holding a medical qualification in this country; previously only fellows examined in anatomy for the fellowship, and only fellows *or members* for the membership. Mr. F. M. Stent was appointed assistant secretary to the examining board in England.

University of London

Four lectures on the integration of the circulation will be given by Dr. R. J. S. McDowall, professor of physiology in the University, at King's College, Strand, W.C., on Thursdays, May 3rd, 10th, 17th, and 24th at 5 P.M. Admission is without ticket.

Eight lectures on the history of physiology are to be given at University College, Gower Street, W.C., by Dr. Charles Singer, professor of the history of medicine in the university, and Dr. K. J. Franklin, lecturer in physiology at Oriel College, Oxford. The first three, by Prof. Singer, will be at 5 P.M. on April 30th, and May 1st and 2nd, and the remainder, by Dr. Franklin, at the same hour on May 7th, 8th, 14th, 15th and 22nd. Admission is without ticket.

The Bayliss-Starling scholarship, of an annual value of about £120, is tenable at University College, and applications are invited before May 12th. The successful candidate will be required to follow a course of training in the principles and methods of research in physiology and/or biochemistry. Particulars will be found in our advertisement columns.

Metropolitan Hospital: Proposed Incorporation

The appeal for £30,000 for repairs and to pay off the debt has produced £22,000. At the recent annual meeting it was decided to incorporate the hospital as a company limited by guarantee. It was stated that the present members of a committee of management might be liable for unlimited sums, a consideration which has recently *led to a refusal to serve on the committee.*

Salford Royal Hospital

Last year there were 4031 in-patients who stayed on the average 20·48 days. There were 29,459 out-patients, an increase of 1180. Traffic-accident patients cost £1087, of which only £221 was recovered. The out-patients' department, built in 1911, is now inadequate, but lack of means prevents extensions.

Medical Tour in the Rhineland

A medical tour of Rhineland spas is being arranged for Whitsuntide. It will begin on May 18th and end on the 28th. Further particulars may be had from Mr. R. O. Rohme, 90, Sheaveshill-avenue, Colindale, London, N.W.9.

Society for Relief of Widows and Orphans of Medical Men

At a quarterly court of directors held on April 11th the President, Mr. V. Warren Low, being in the chair, an application for relief was considered from the widow of a member who had just died. He had been elected a life member in 1921 and the widow was left practically destitute with nine children, four under 16 years of age. The court voted her a yearly grant of £60 for herself and of £50 a year for each child under 16, a total of £260. She will also receive at Christmas the usual present of £10 for herself and £40 for the four children. Membership of the Society is open to any registered medical practitioner, who at the time of his election is resident within a 20-mile radius of Charing Cross. The annual subscription ranges from two to four guineas, according to the age of the candidate. Particulars from the secretary, at 11, Chandos-street, London, W.1.

Institute of Medical Psychology

This institute in London, formerly called the Tavistock Clinic, has received an anonymous donation of £300 "to start research work on the remedial treatment of children who suffer nervous troubles as an after-effect of assault." It has also received an offer from a medical man who undertakes to bequeath £100 to the institute if 29 other persons will do the same. The arrangement, he suggests, would be a "gentleman's agreement," and the bequests would be revocable in the event of "difficult circumstances."

It is stated that 77 children from London County Council schools have been referred to the institute during the past 12 months, 15 being sent for consultation only. Of those who received treatment, "satisfactory adjustment" was effected in 23 per cent., "partial adjustment" in 16 per cent., while 46 per cent. were still undergoing treatment at the end of the period. The remaining 15 per cent. are described as either unsuitable or affected by uncoöperative parents.

Medical Diary

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MONDAY, April 23rd.

Odontology. 8 P.M. Paper. Dr. Franz Duyvensz (Amsterdam): Saliva. Mr. F. W. Broderick will open the subsequent discussion.

TUESDAY.

Medicine. 4 P.M. Clinical Meeting at University College Hospital, W.C. 4 P.M. Cases at the Hospital. 5 P.M. Tea in the Refectory, Medical School. 5.15 P.M. Discussion in the Lecture Theatre of the Medical School. Cases: Dr. F. J. Poynton: 1. Hepatomegaly and Splenomegaly; ? Lymphadenoma. Dr. J. W. McNee: 2. Acute Lymphadenoma with Pleural Effusion. 3. Lead Neuritis. 4. Multiple Neuro[illegible]. Dr. Kenneth Harris: 5. Chr[illegible] 6. Chronic Pulmonary T[illegible] Amylosis. 7. Aortic Aneurysm with Portal Cirrhosis. Dr. K. Harris and Dr. P. Kerley: 8. Vena Azygos Lobe with Hæmoptysis. 9. Vena Azygos Lobe in a Child with Chronic Bronchitis. Dr. Saxby Willis: 10. Aortic Aneurysm and Syphilis of Lung. Dr. A. Hall: 11. Congenital Heart-block and Peroneal Atrophy. Mr. G. E. O. Williams: 12 and 13. Pain of Vascular Origin in the Toes Relieved by Alcohol Injection. Mr. C. W. Flemming: 14. Recurrent Abscesses in Neck. Mr. C. Dee Shapland: 15–18. Fundus Oculi Changes of Medical Interest. Dr. L. P. E. Laurent: 19. Myasthenia Gravis (for Dr. C. Bolton). 20. Sarcoma of Spleen and Glands. 21. Granular Kidney following Acute Glomerular Nephritis. 22. Intracranial Aneurysm with Signs of Pressure on Pons. Dr. H. P. Himsworth: 23. Hæmochromatosis. 24. Parathyroid Deficiency. 25. Xanthoma Diabeticorum. Mr. Julian Taylor: 26. Chloroma. Dr. W. J. Pearson: 27. Congenital Morbus Cordis with ? Adherent Pericardium. 28. Hirschsprung's Disease Improved by Sympathectomy.

WEDNESDAY.

Comparative Medicine. 5 P.M. Discussion on the Results of Suture of Divided Nerves, to be opened by Sir Charles Ballance and Prof. John Beattie.

THURSDAY.

Urology. 8.30 P.M. Discussion on Anæsthesia in Urinary Surgery, to be opened by Dr. H. Featherstone and Prof. C. A. Pannett. Members of the Section of Anæsthetics are specially invited to attend.

FRIDAY.

Epidemiology and State Medicine, and Psychiatry. 8 P.M. Special Discussion on the Value of the Treatment of Mental Deficiency, to be opened by Dr. F. C. Shrubsall, Dr. W. Rees Thomas, and Dr. Noel Burke.

MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W.

MONDAY, April 23rd.—8.30 P.M., Discussion on Failures of Gastric Surgery, to be introduced by Dr. John Ryle, Mr. A. J. Walton, and Dr. Eustace Callender.

MEDICO-LEGAL SOCIETY.

THURSDAY, April 26th.—8.30 P.M. (at 11, Chandos-street, W.), Mr. Claud Mullins: How Should Sexual Offenders be Dealt With.

SOCIETY OF MEDICAL OFFICERS OF HEALTH, 1, Upper Montague-street, Russell-square, W.C.

FRIDAY, April 27th.—5 P.M. (Fever Hospital Medical Services Group), Discussion on the Relationship of Measles and Whooping-cough to Chronic Inflammatory Conditions of the Chest, to be opened by Dr. C. D. Agassiz, Dr. G. Jessel, and Dr. J. E. McCartney, dealing respectively with the clinical, radiological, and pathological aspects of the subject. Members of the Tuberculosis, School Medical, and M. and C. W. Groups are invited to be present.

ST. JOHN'S HOSPITAL DERMATOLOGICAL SOCIETY.

WEDNESDAY, April 25th.—5 P.M. (49, Leicester-square, W.C.), Dr. Sibyl G. Horner: Industrial Dermatosis.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY, April 23rd, to SUNDAY, April 29th.—BRITISH RED CROSS CLINIC FOR RHEUMATISM, Peto-place, N.W. Tues. and Thurs., at 8.30 P.M. Course in Rheumatism. ROYAL EYE HOSPITAL, St. George's-circus, S.E. Course in Ophthalmology. Afternoons.—SAMARITAN HOSPITAL, Marylebone-road, N.W. Week-end Course in Gynæcology. All day Sat. and Sun.—MEDICAL SOCIETY OF LONDON, 11, Chandos-street, W. Dr. A. E. Clark-Kennedy: Lecture on Cardiac Irregularity, on Tues., at 2.30 P.M. Dr. Philip Ellman: Lecture on Suppurative Diseases of Lungs, on Wed., at 8.30 P.M. Mr. E. A. Peters: Lecture on Septic Tonsils, Nasopharyngitis, and its Results, on Wed., at 4 P.M. (free to Members and Associates of the Fellowship of Medicine and open to non-members). Dr. Philip Ellman: Lecture on Industrial Diseases of Lungs, on Fri., at 8.30 P.M.—PANEL OF TEACHERS. Individual clinics in various branches of Medicine and Surgery are available daily by arrangement with the Fellowship. Courses of instruction, clinics, &c., arranged by the Fellowship of Medicine are open only to Members and Associates, unless otherwise stated.

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE, Hammersmith, W.

DAILY.—2 P.M., Operations, Medical and Surgical Clinics.

MONDAY, April 23rd.—10 A.M., Skin Clinic, Medical Wards. 11 A.M., Surgical Wards. 2 P.M., Gynæcological and Surgical Wards, Eye and Gynæcological Clinics.

TUESDAY.—10 A.M., Medical Wards. 11 A.M., Surgical Wards. 2 P.M., Throat Clinic. 4.15 P.M., Lecture, Mr. Green-Armytage: Post Maturity.

WEDNESDAY.—10 A.M., Medical Wards, Children's Ward and Clinic. 2 P.M., Eye Clinic.

THURSDAY.—10 A.M., Neurological and Gynæcological Clinics. 11.30 A.M., Fracture Clinic. 2 P.M., Eye and Genito-urinary Clinics. 4.15 P.M., Lecture, Mr. Batchelor: Head Injuries.

FRIDAY.—10 A.M., Skin Clinic. 12 noon, Lecture on Treatment. 2 P.M., Throat Clinic. 4.15 P.M., Lecture, Dr. Konstam: Megalocytic Anæmia.

SATURDAY.—10 A.M., Medical and Surgical Wards, Children's and Surgical Clinics.

The Lectures at 4.15 P.M. are open to all medical practitioners without fee.

HOSPITAL FOR EPILEPSY AND PARALYSIS, Maida Vale, W.

THURSDAY, April 26th.—3 P.M., Dr. Blake Pritchard: Clinical Demonstration.

ST. MARY'S HOSPITAL INSTITUTE OF PATHOLOGY AND RESEARCH, Paddington, W.

THURSDAY, April 26th.—5 P.M., Mr. Hugh W. Bell Cairns: Intracranial Surgery.

ST. PAUL'S HOSPITAL, Endell-street, W.C.

WEDNESDAY, April 25th.—4.30 P.M., Mr. W. K. Irwin: Diagnosis and Treatment of some Important Bladder Conditions.

ROYAL NORTHERN HOSPITAL, Holloway-road, N.

TUESDAY, April 24th.—3.15 P.M., Dr. C. Gouldesbrough: Spinal Abnormalities.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.

Monday, April 23rd, to Saturday, April 28th.—Second Week of Intensive Course in Laryngology, Rhinology, and Otology.

LEEDS GENERAL INFIRMARY.

Tuesday, April 24th.—3.30 P.M., Dr. Cooper: X Ray Therapy.

UNIVERSITY OF BIRMINGHAM.

Tuesday, April 24th.—3.30 to 5 P.M. (at the Children's Hospital), Dr. G. P. Mills: Demonstrations of Orthopædic Cases.

Wednesday, April 25th.—4 P.M. (in the Lecture Theatre of the Medical Faculty Buildings), Prof. E. D. Adrian: The Activity of Nerve Cells. (First of Two Lectures).

Thursday.—4 P.M., Dame Louise McIlroy: The Toxæmias of Pregnancy. (First of Two Ingleby Lectures.)

Friday.—3.30 to 5 P.M. (at the Queen's Hospital), Dr. Douglas Marsh: Diseases of the Tonsils and their Appropriate Treatment.

MANCHESTER ROYAL INFIRMARY.

Tuesday, April 24th.—4.15 P.M., Dr. F. E. Tylecote: Undulant Fever and other Unusual Pyrexias.

Friday.—4.15 P.M., Mr. J. P. Buckley: Demonstration of Surgical Cases.

GLASGOW POST-GRADUATE LECTURES.

Wednesday, April 25th.—4.15 P.M. (at the Royal Infirmary), Mr. J. A. C. Macewen: Surgical Cases.

Appointments

Kitson, J. H., M.B., Ch.B. Manch., has been appointed Medical Officer of Health and School Medical Officer, Todmorden.

London County Council Hospital Staff.—The following appointments, promotions, and transfers are announced. A.M.O. (I.) and (II.) = Assistant Medical Officer, Grades I. and II.

Fish, R. H., M.B. Lond., Senior A.M.O., II., High Wood Hospital for Children.

Begg, N. D., M.D. Aberd., A.M.O., I., North Eastern.

Cunningham, A. A., M.B. Dubl., A.M.O., I., Joyce Green.

Macfarlane, L. H., M.D. Lond., A.M.O., I., Northern.

Taylor, I., M.B. Lond., A.M.O., I., Grove.

Scholes, J. L., M.D. Melb., A.M.O., II., Queen Mary's Sidcup.

Jones, A. N., M.B. Liverp., A.M.O., II., St. Luke's Chelsea.

Turnbull, H. I., M.B. Sydney, A.M.O., II., Holborn and Finsbury Institution.

Cussen, K. R., M.B. Melb., A.M.O., II., Archway.

Cardno, J. A., M.B. Aberd., A.M.O., II., St. Mary, Islington.

Certifying Surgeons under the Factory and Workshop Acts: Bromley, E., M.B., B.S. Durh. (Arnesby, Leicester); McMichael, G. B., L.R.C.P. Lond., M.R.C.S. (Vowchurch, Hereford).

Vacancies

For further information refer to the advertisement columns

Aberdeen Royal Infirmary.—Asst. M.O. for Radium Dept.

Altrincham General Hospital.—Jun. H.S. At rate of £120.

Ashton-under-Lyne District Infirmary.—Reg. Surg. O. Also H.S. £200 and £150 respectively.

Birmingham, Canwell Babies' Hospital.—Res. M.O. At rate of £250.

Birmingham, Maternity and Child Welfare Dept.—Three Temp. M.O.'s. Each £10 per week.

Birmingham, Selly Oak Hospital.—Cas. O. At rate of £200.

Birmingham University Faculty of Medicine.—Lecturer in Bacteriology. £400.

Bradford Royal Infirmary.—Res. Surg. O. £225. Also H.P. and two H.S.'s. Each at rate of £135.

Bridgend, Glamorgan County Mental Hospital.—Jun. Asst. M.O. £350.

Burnley, Victoria Hospital.—H.P. At rate of £150.

Cardiff Royal Infirmary.—H.P. and H.S. Each at rate of £50.

Cheltenham General and Eye Hospital.—H.S. £200.

Chester Royal Infirmary.—Hon. Asst. Radiologist.

Dewsbury and District General Infirmary.—Part-time Hon. Pathologist.

Durham County Hospital.—H.S. £150.

Golden Square Throat, Nose, and Ear Hospital, Golden-square, W.—H.S. £100.

Grimsby Corporation Hospital and Sanatorium.—Res. Med. Asst. £350.

Guy' [illegible] *School, S.E.*—Dental Travelling Scholar- [illegible]

Hac [illegible] *'reet, Homerton, E.*—Asst. M.O. £250.

Hos [illegible] *Great Ormond-street, W.C.*—Physician [illegible] so Surgeon.

Hor [illegible] Res. M.O. At rate of £200.

Huddersfield Royal Infirmary.—Jun. Cas. O. and Res. Anæsthetist. At rate of £150.

Ilford, King George Hospital.—H.S. At rate of £100.

Indian State Railways.—Dist. Med. Officers.

Ipswich, East Suffolk and Ipswich Hospital.—H.S. £120.

Italian Hospital, Queen-square, W.C.—Hon. Asst. Phy.

Keighley Borough Council.—Asst. M.O.H. and Asst. School M.O. £500.

King's College Hospital, Denmark Hill, S.E.—Hon. Radiologist.

Lancaster Royal Infirmary.—Jun. H.S. At rate of £130.

Leicester, Leicestershire and Rutland Mental Hospital, Narborough. Asst. M.O. £350.

Liverpool Port Sanitary Authority.—Port Sanitary Officer. £700.

Llanelly and District Hospital.—H.S. £150.

London Lock Hospital, 91, Dean-street, W.—Res. M.O. to Male Depts. At rate of £175

London University.—Geoffrey Duveen Travelling Studentship. £450.

Margate Royal Sea-Bathing Hospital.—Res. Asst. Med. Supt. £500.

Middlesex County Council.—Dist. M.O.'s and Public Vaccinators. Each £50.

Mile End Hospital, Bancroft-road, E.—Asst. M.O. £250

Nottingham General Hospital.—H.P. At rate of £150.

Oldham Royal Infirmary.—H.S., Cas. O., and H.P. Each at rate of £175.

Paddington Hospital, Harrow-road, W.—Asst. M.O. £250.

Preston and County of Lancaster Royal Infirmary.—H.S. £150.

Queen Mary's Hospital for the East End, E.—Director of Pathology. £750.

Queen's Hospital for Children, Hackney-road, E.—Res. M.O. At rate of £200.

Rotherham Hospital.—Cas. H.S. £150.

Royal Free Hospital, Gray's Inn-road, W.C.—Sen. Res. M.O. £150.

Royal Northern Hospital, Holloway, N.—Clin. Asst. for Med. Out-Patient Dept.

Royal Waterloo Hospital for Children and Women, Waterloo-road, S.E.—H.P. At rate of £100.

Sheffield Royal Hospital.—Ophth. H.S. £120.

Southend Municipal Hospital.—Asst. M.O. £275.

South Shields, Ing [illegible] H.S. £150.

St. Bartholomew's I [illegible] M.O. to X Ray Dept.

St. Mary's Hospit [illegible] *hildren, Plaistow, E.*—Clin. Asst. to [illegible]

St. Nicholas Hospit [illegible] Asst. M.O. £250.

St. Peter's Hospital, Vallance-road, E.—Asst. M.O. £250.

Stoke-on-Trent, North Staffordshire Royal Infirmary.—Orthopædic H.S. £150.

Sunderland Municipal Hospital.—Res. Asst. M.O. £200.

Sunderland Royal Infirmary.—H.S. £200.

Swansea County Borough.—Asst. M.O. £500.

Swansea Valley, Adelina Patti Hospital, Craig-y-nos.—H.P. At rate of £100.

University College, W.C.—Bayliss-Starling Memorial Scholarship. £120.

West End Hospital for Nervous Diseases, Gloucester Gate, Regent's Park, N.W.—H.P. At rate of £150.

West London Hospital, Hammersmith-road, W.—Hon. Dermatologist. Also Hon. Asst. Anæsthetist.

Westminster Hospital, Broad-sanctuary, S.W.—H.S. to Spec. Depts. At rate of £104.

Wolverhampton Royal Hospital.—H.S. At rate of £100.

Wolverhampton and Midland Counties Eye Infirmary.—H.S. £150.

The Chie[illegible] announces vacant appointments for [illegible] ons at Clacton-on-Sea, Essex; and [illegible]

The Home Secretary gives notice of a vacancy for a Medical Referee under the Workme[illegible] for the Kirkcaldy Sheriff Court Dis[illegible] of Fife and Kinross. Application [illegible] Private Secretary, Scottish Office, [illegible] W., not later than May 5th.

Births, Marriages, and Deaths

BIRTHS

Elder.—On April 15th, at Welbeck-street, W., the wife of Howard Elder, M.B., Ch.B., South Norwood, S.E., of a daughter.

Evans.—On April 14th, at Devonshire-place, W., the wife of Dr. Horace Evans, of a daughter.

Geldard.—On April 8th, at "Dalmeny," Sheringham, the wife of Dr. Colin Geldard, of a daughter.

Matheson.—On April 8th, at "Eversley," Boxley-road, Maidstone, the wife of Major J. C. M. Matheson, D.S.O., M.B., Ch.B., of a daughter.

Wilson.—On April 11th, at High-street, Linton, Cambs, the wife of Dr. Hugh Mundle Wilson, of a son.

MARRIAGES

Boyle—Scott.—On April 2nd, at St. John's Church, Chorlton-cum-Hardy, Manchester, Major H. A. Boyle, R.A.M.C., to Evelyn Maude, elder daughter of Mr. and Mrs. J. N. Scott, of Chorltonville, Manchester.

[illegible] n April 9th, at the Register Office, [illegible] Burnet Byrom, only son of Mr. and [illegible] of Selby Bridge, I.O.M., and Wigan, [illegible] Joyce Pritchard, only daughter of Mr. and Mrs. Stanger Pritchard, of Cyprus-avenue, Church End, Finchley.

DEATHS

Berry.—On April 15th, at Bramblebury, near Wendover, Frances May Dickinson Berry, M.D., beloved wife of Sir James Berry, F.R.C.S., aged 76.

Brown.—On April 8th, Frederick Nathaniel Brown, L.R.C.P., M.R.C.S., Hale Cottage, Sandbanks-road Parkstone, Dorset.

Keith.—On April 8th, at Comely Bank, Edinburgh, after a short illness, Martha Keith, M.B., Ch.B., D.P.H.

Sanderson.—On April 15th, at Croxteth-grove, Liverpool, William Sanderson, M.B., Ch.B. Edin.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

NOTES, COMMENTS, AND ABSTRACTS

PETER DE ALCOBASSE

PHYSICIAN TO HENRY IV.

By R. R. JAMES

ON Dec. 14, 1420, Peter de Alcobasse had a grant of denization recorded on the Patent Roll of 8, Henry V, m. 5. It is stated that he was born in Portugal; his grant was under the privy seal and he appears to have paid the sum of £30 into the hanaper [1] for the privilege. Besides this he also appears on the Patent Rolls in the year 1412, Feb. 7, where it is recorded that the King had granted him the prebend of West Thurrock in the Free Chapel of Hastynges; while on Feb. 29, 1412, there is another grant to him, as the King's servant and physician, of the Deanery of Wymburnemynster (Wimborne). Still later in 1412 occurs the mandate to the Dean and Chapter of the King's free chapel of Hastynges to admit and induct the King's physician, Peter Acobasse (*sic*), to the prebend of West Thurrock and to assign to him a stall in the choir and a place in the Chapter. This grant by Henry IV landed poor Peter in trouble in the Court of Chancery in the next reign as will be seen later.

Hutchins, "Hist. of Dorset," vol. III, p. 187, gives: "Peter de Altobasso—or bosco, an Italian, the King's physician, admitted Dean of Wimborne, 29 April, 1412." It is also stated that Peter was Prebendary of Hoxton in St. Paul's, London, in 1420, and of Windsor in 1415; and that he seems to have resigned Wimborne in 1415. The manuscript medical court roll of the late Dr. S. D. Clippingdale, preserved in the library of the Royal College of Surgeons, gives him as Prebendary of St. George's, Windsor, Dec. 21, 1422, vice John Eston, deceased. The reference is to Rymer's "Foedera."

Peter died in 1427. His will, in Latin, would appear to be the earliest medical will preserved in the P.C.C.; there are several points of interest in it, notably the description of "magister in medicinis." The following is the translation :—

> Peter de Alcobascho. (P.C.C., Luffenham, 8.) In the name of God Amen: Thursday next after the Feast of St. Dunstan (i.e., May 19) 1427 I Peter de Alcobascho Master in Medicines of good and sound memory make my testament in this manner. *In primis* I leave my soul to God Almighty, the Blessed Mary and all Saints and my body to be buried in the church of the order of Friar Preachers. I leave to the aforesaid church for my sepulture 20s. I leave to William Denys my servant (*famula*) £20 and one good (*meliore*) piece of silver with a cover, 1 cloak of sanguine (sangwen) furred with marten. I leave to John Wally £10, 1 covered piece, 1 scotch horse and a furred cloak (*toga*). Item I leave to John Cokerman £10, 1 covered piece and a green cloak and a horse called "oldebayard." Item I leave to Ralph Bolde £10, and 1 piece covered and a furred cloak and 1 horse. Item I leave to William Glouceter £10. To Thomas Belle 10 marks 9 shillings. To Thomas lestaville 6 marks and a horse. I leave to Richard my *Capanus* [2] £10 and a horse and a covered piece. To William Barbour 10 marks and an uncovered piece; to Robert de Stabill 6 marks; to Alice Jorge 20s., to Agnes Cornewales 10 marks. To William Sikyltrys, chaplain, 1 mark. To John Carter of Plumsted 2 marks 1d.; to the widow of Richard Clerk my servant 6 marks; to the bedewoman of St. Katherine 9s. To the wife of Robert Notyngham 10 marks. The Residue of all my goods not left in the present testament I give and leave my executors, viz., Thomas Chawcers, Lodovic Johan, Thomas Walsyngham, John Cornewales and Richard Drake, Chaplain, that they do not neglect to dispose in the best manner thay are able for the good of my soul. Proved, 30, June, before Master John Lyndefeld, Commissary.

On the Close Roll of 2, Henry V, May 3 is found mention of the lawsuit of Thomas Feriby, clerk, otherwise priest, against Peter for thrusting him out of his prebend of West Thurrock. It is too long for insertion here; but from Feriby's petition it would appear that he was appointed to the prebend, vacant by the death of John Harmesthorpe, "being a prebend in the King's free chapel of Hastyng in the diocese of Cicestre, and in the gift of William Bourgchier, Knight, in right of Anne his wife, daughter and heir of Eleanor, Duchess of Gloucester." Feriby enjoyed his prebend "peaceably until unlawfully thrust out by the said Peter, by colour of the late King's collation to him . . . at the untrue submission of the said Peter that the same was void, when it was not, and in the King's gift, which it was not." The Sheriff of Essex had notice to make Peter appear in Chancery to show cause why he should not be made to give the prebend back to Feriby. The latter appeared in person and Peter by his attorney, John Corve, who averred that by letters patent dated at Westminster 7, Feb. 13 Henry IV the late King gave him the prebend, being then void and in his gift. The result of the action is not recorded.

I am indebted to Mr. J. Harvey Bloom for the transcript of the will and for the extracts from the Patent and Close Rolls.

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[1] Hanaper: an office of the Court of Chancery (Trice Martin's Record Interpreter).

[2] A contraction for Capellanus, a chaplain.

RADIOGRAPHY OF LIVING ANATOMY

IN a paper read recently before the Rugby and District Medical Society Dr. J. F. Brailsford, who is radiological demonstrator in living anatomy in the University of Birmingham, demonstrated some of the radiographic appearances of normal structures which have led to serious misinterpretation.

In radiography of the skull the slightest obliquity may result in the dense structure of the base obscuring the normal accessory sinuses on one side, and this may lead to the error of diagnosing that the sinus is occluded. The dense shadow of the petrous portion of the temporal bone may be projected through the plane of the antrum and its straight upper surface may be misinterpreted as a fluid level. An unusual instance of misinterpretation of the normal was as follows :—

> A child with a swelling at the angle of the mandible was X rayed and the radiogram was interpreted as showing a sarcoma. A surgeon was consulted and resection of the involved bone was decided upon. Immediately before the operation the surgeon asked me if I could give him an indication of the boundary of the tumour so that he could gauge what length of bone he must remove from the crest of the ilium to form a graft. It was demonstrated to him that the radiogram showed normal structures only. The shadow of the hyoid bone projected against the mandible had suggested a tumour. A few days later the swelling was explained as an attack of mumps.

In radiography of the thorax it is essential for comparative pictures to be taken in the same phase of respiration. Another source of fallacy arises from the fact that structures in close contact with the film appear denser than the surrounding tissues owing to being screened from secondary radiation.

> A patient was radiographed at a tuberculosis clinic and the diagnosis of bilateral spontaneous pneumothorax made. Examination of the radiograms suggested that further films should be taken, one with reduced pressure against the breasts, and another with the film barely touching the patient. These proved that the abnormal shadows were due to the contact cutting out secondary radiations and consequently reducing the density of the protected part.

In radiography of the alimentary canal it is essential before any opaque medium is introduced to make sure that no abnormal shadows exist which might be obscured by it. In making the gall-bladder visible by substances excreted in the bile and making it denser than the surrounding structures, negative shadows—e.g., of gall-stones—may be simulated by bubbles of gas in the duodenum.

CINERADIOGRAPHY

Owing to the limited time permissible during screening and the limited area which the observer can watch, this method of demonstration is by no means ideal for teaching purposes. What we need, said Dr. Brailsford, is a carefully edited cineradiographic film study of the viscera. This was recognised by Dr. John MacIntyre in 1896, a few months after Röntgen's discovery, and he exhibited a 40-ft. film showing the movements of the bones of a frog's leg to the Glasgow Philosophical Society in that year, and in the *Archives of Skiagraphy* for April, 1897, he described further experiments. In this country Dr. Russell Reynolds had developed indirect cineradiography. More recently Prof. Robert Janker at Bonn had advanced the method to such an extent as to give early hope of using cineradiography in teaching living anatomy.

In the direct method the patient is placed in front of an X ray tube and against a leaded screen containing a window opposite the area to be radiographed. Behind the screen a large film of the necessary size is fixed on rollers and the timing of exposure so devised that at least 16 exposures per second can be made on the rapidly changing surface. From the film obtained reduced films capable of fitting into a cineprojector would have to be made. The large contact films permit a study of the changes in form better than the small films obtained in the indirect method, but the cost is considerable, and while the method may be used for the production of standard teaching films it can hardly come into general use. Simpler devices facilitate a dozen or more exposures within a short time, useful in the examination of stomach and duodenum. A modification of this direct method for recording the movements of the heart was described by Robert Knox in 1925.

In the indirect method a cinephotographic record of the images is produced on the fluorescent screen. The screen image must be sharply defined and there must be no afterglow. By this method Janker has been able to make films little inferior to those obtained by the direct method but at a trifling cost. The intervals between each exposure will determine the rapidity (when shown in the cineprojector) of the movements of the structures examined.

These methods, said Dr. Brailsford, should solve many of the problems of visceral movement. The movements of the heart in diastole and systole during expiration and inspiration could be analysed. The peristalsis of the alimentary canal could be determined with accuracy and the movements of joints in this better than in any other way.

ACUTE SEPSIS IN THROAT AND EAR

IN the *Annales d'otolaryngologie* (1933, No. 12) G. Worms and A. Deburge report the case of a young man in whom an attack of tonsillitis was followed by sudden intense dysphagia and dyspnœa necessitating tracheotomy. There was great œdema of the vestibule of the larynx, the epiglottis, and the aryteno-epiglottidean folds; incision of the latter with curved scissors gave immediate and dramatic relief of the pain. The patient's rapid recovery is ascribed in part to drainage by the tracheotomy incision, from which there was a profuse and foul discharge. To the same journal J. Piquet and P. Coumouma contribute an interesting article on lateral pharyngeal abscess. This is to be distinguished from peritonsillar abscess, in that it is situated externally to the wall of the pharynx and arises in lymph glands about the carotid sheath. It is ordinarily treated by incision through the neck, and any attempt to open it through the mouth is considered very dangerous by reason of the risk of injury to the great vessels: but these authors find that in children the abscess tends to point in the pharynx behind the posterior pillar of the fauces, and may safely be opened in this situation by means of sinus forceps.

D. van Caneghem, of Bruges, also in this issue, reports that he has made a careful investigation into the pressure of the cerebro-spinal fluid in extradural complications of otitis media. In cases of acute mastoiditis, he finds that extradural abscess almost always causes an increase of pressure to above 30 cm. of water, and he believes that extradural abscess should be regarded as probably present in any case which shows this degree of hypertension.

THE LA-TOJA SPA

THE therapeutic claims of the La-Toja Spa were brought to the attention of the medical profession last week by the opening of an installation in connexion with the Spa at Sunderland House, Curzon-street, London, by the Spanish Ambassador. Major P. C. Burton, in welcoming Don Ramón Perez de Ayala, gave reasons for his personal conviction that real medical needs would be met by making the La-Toja treatment available for the relief of rheumatism and allied complaints, and his Excellency in declaring the Spa open expressed his sympathy with the movement as being of therapeutic value while forming a link in the historic friendship between two nations. The La-Toja Spa is near Vigo, and the intention of the London establishment is to make its products available for home treatment on medical advice.

IS PASTEURISATION A COMPLETE SAFEGUARD?

AT a recent sessional meeting of the Royal Sanitary Institute (Jour. R.S.I., April, 1934, p. 486) Mr. Ben Davies said the great thing was to give people confidence in milk so that they should drink more. "With a few ounces of extra daily consumption per capita, the reason for marketing boards and government intervention would disappear." Against the dangers from tuberculosis, abortus fever, and mastitis, he said, we had "a positive and unfailing safeguard" in pasteurisation. Sir W. Dalrymple-Champneys agreed with him that pasteurisation if efficient was a positive and unfailing safeguard; most pasteurisation he had seen was, he added, inefficient. Compulsory pasteurisation not being at present attainable, he thought the best line of immediate advance was that recently contemplated in Manchester—viz., to exclude from the city all but pasteurised milk and that from tubercle-tested herds.

NEW PREPARATIONS

ANTIVIRIN NASAL JELLY (Glaxo Laboratories, 56, Osnaburgh-street, London, N.W.).—The organisms found in the nasopharynx in cases of the common cold are attacked by this preparation. Owing to its viscosity the jelly penetrates the folds of the mucous membrane and brings the appropriate antiviruses into contact with the organisms. Small quantities of Nasal Jelly should be squeezed into the nostrils several times a day, far back enough to bring some of the jelly in contact with the pharyngeal mucous membrane. The treatment should begin, if possible, at the onset of a cold, but is still useful when the condition is advanced.

BURNOL ACRIFLAVINE CREAM (Boots Pure Drug Co., Ltd., Nottingham).—This is a surgical dressing non-toxic, antiseptic, and readily applied; it is absorbent and redressings are easily effected without damage to the healing tissues. The manufacturers claim that its use has given excellent results in the treatment of cuts and grazes; herpes, impetigo, and infective skin conditions; styes and infective conditions of the eyelids; blisters on feet or hands; sunburn; cracked skin and chapped hands. The cream is put up in convenient tubes, and full particulars of application are supplied with each tube.

THE MARMITE FOOD EXTRACT CO. LTD. inform us that as the result of biological tests carried out by a recognised authority, they are now able to state that the vitamin B_1 potency of their product is 840 international units per ounce. This information is of interest in view of recent correspondence in our columns (see THE LANCET, Jan. 13th, p. 101, and Feb. 3rd, p. 261).

ADDRESSES AND ORIGINAL ARTICLES

INTERNATIONAL COÖPERATION IN PUBLIC HEALTH

ITS ACHIEVEMENTS AND PROSPECTS *

BY SIR GEORGE S. BUCHANAN, C.B., M.D., F.R.C.P. Lond.

LECTURE I

IT may be considered to have been the intention of Dr. Gavin Milroy when founding these lectures that they should be a means of enabling a man who had been at work in some particular corner of public health to obtain useful publicity for his subject, and at the same time impose on him the self-discipline of reviewing his experience of that subject in the way which is demanded of one who has the honour of lecturing to the Royal College of Physicians. It seemed to me that I could find such a corner, which would justify my lecturing on it now. After 38 years of official work in the Government health service, I am handing on to my successor the work in applied epidemiology and general hygiene which has been my chief occupation as Senior Medical Officer at the Ministry of Health. That work has come increasingly to be related with, and sometimes even to depend upon, international coöperation, and it is to some aspects of this coöperation that I am now inviting your attention.

Apart from a few questions of port sanitary administration, and from negotiations with foreign countries in connexion with the control over the wholesomeness of imported foods which began with Mr. Burns' Public Health (Regulations as to Food) Act, 1905, I had little personal experience of official international health work before 1914, when the Local Government Board proposed to the Foreign Office that I should be the delegate for Great Britain at the International Public Health Office in Paris. Of this office, which, because French is its official language, is better known as the "Office International d'Hygiène publique," I will have more to say later. Its importance in British eyes was at that time mainly diplomatic. The British delegate was expected to do his best to make our liberal ideas prevail when it came to imposing restrictions on shipping on account of infectious disease, and be ready to give a rational turn, from the point of view of British interests and British hygiene, to the administrations in the Suez Canal, at Constantinople and elsewhere, which controlled the key points by which first cholera, and later plague, might gain access to Europe. In this respect he had to maintain the positions which, since the cholera pandemics of the middle of last century and the later Hamburg outbreak of 1892, the medical advisers of the British Government, notably Netten Radcliffe and Thorne-Thorne, had successfully fought for and secured. But he was not expected, nor at that time would it have appealed to him, to make the international office a means by which the delegates of the several countries there represented (and at that time many important countries remained outside) could concert together common official action for the prevention of disease or for the promotion of public health, outside these narrow limits. Within them our Government had been admirably served, first by my colleague Dr. Theodore Thomson, whose untimely death was an incalculable loss to State medicine in England, and then for a short period by the late Dr. R. Johnstone, who had seen through the International Sanitary Convention of 1912. I need not speculate on what I might have myself made of the position at that time; the war years supervened, during which most of the functions of the Paris Office were in abeyance. After 1918 the situation was altered. The war itself had shown the advantages, as between the allied armies and countries, of pooling information about disease prevalence and prevention—or to put the matter inversely, the drawbacks of inadequate coöperation. The great forces of the Red Cross, with their international outlook, could hardly have been demobilised without thought being given to the extension of their universality and catholicity to the post-war world for which we were then groping. The League of Nations was being formed, and the ideals of its founders for obtaining union between nations extended to its providing, or even forcing on, international coöperation in technical and humanitarian questions. Moreover, in many countries, by the formation of separate Ministries of Health or otherwise, public health was receiving a higher official status, and was undertaking new work calling for international contacts. Finally a common peril, the threatened spread of epidemic typhus from Russia through Poland to the west of Europe in 1918 to 1920, made an immediate call for coöperation.

The years 1919–21 thus were the occasion of many conferences and discussions with the object of securing, if possible, a single mechanism, dependent on the League of Nations, by which health questions affecting Governments could be dealt with internationally, and of settling at the same time what particular questions were ready for the proposed machine. Those who are interested in the phase in which the matter stood in 1921 may be referred to an address which I gave to the Society of Medical Officers of Health in February of that year (THE LANCET, 1921, i., 415) on International Organisation and Public Health. It is true that this address led up to the description of the mechanism for the purpose which had been adopted by the first Assembly of the League in December, 1920, but did not materialise—the chief reason being that certain important Governments objected to the Paris Office being placed under the direction of the League of Nations. But they will also find a number of health matters then catalogued as requiring joint Government action which *have* since materialised and have now been adequately treated by the actual international machinery which was ultimately arranged, and has been in operation during the last 13 years.

A few landmarks have here to be noted for reference. The Secretary-General, personally and through Dame Rachel Crowdy, D.B.E., who was then charged with this subject at Geneva, and afterwards through the late Dr. E. J. Steegmann, acting Medical Secretary, took steps to consult responsible officers in the public health services of several countries, including the United States, while several members of the Council of the League, particularly M. Léon Bourgeois and Lord Balfour, were active in pressing for immediate attention to the question. The then Director (M. Cazotte) and Assistant Director (Dr. Pottevin) of the Office International d'Hygiène publique, and M. Velghe, the President of its Permanent Committee, were naturally brought into these consultations, as was the League of Red Cross Societies through its General Medical Director (Colonel R. P. Strong), and the International Labour Office, in respect of its industrial medical section, through Mr. H. B. Butler. By July, 1919, the position was ripe for an informal conference, held in London at the Ministry of Health, over which its then Parliamentary Secretary, the present Lord Astor, presided. This conference was then invited by the Council of the League of Nations to reassemble as a formal conference, adding to its members a small number of international health experts. This formal conference met in London in April, 1920. Based on its work a draft constitution of a public health organ of the League was submitted to a meeting of the Council at San Sebastian in August, 1920, which I attended as technical adviser to Lord Balfour. There emerged the constitution accepted, with a few modifications, by the First Assembly on Dec. 10th, 1920, and recorded in its minutes. The decision of the Assembly, to become effective, required the assent of the Governments parties to the Rome Convention, 1907, and, as stated above, it was afterwards found that this assent could not be obtained. The First Assembly plan, stated briefly, was to recognise the existing state of things by continuing the Office International with its existing personnel and offices at Paris, which would be the normal place for meetings, but to transfer much of its executive work and all new undertakings to a medical secretariat at Geneva. The latter was to be directed by a small technical executive "Standing Committee," which in its turn was to get its policy from and be responsible to a general Health Council. The last-named would have consisted of the delegates to the Permanent Committee of the Office International with the addition of technical delegates from various countries not then participating in the work of the Office. The general Health Council—i.e., the enlarged Permanent Committee of the Office—the Executive "Standing" Committee, and the Geneva medical staff were for their particular business to be in a mutual relation comparable to that of the Assembly, Council, and Secretary-General of the League itself.

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* The Milroy Lectures delivered before the Royal College of Physicians of London on Feb. 27th and March 1st, 1934, with a few subsequent additions of detail. Lectures II. and III. will appear in coming issues.

The point of this scheme which is most noteworthy in view of subsequent developments was that it made the whole health work of the League, including that of the Paris Office which would have been placed under the direction of the League, ultimately dependent on a general assembly consisting of technical delegates all nominated officially to that position by their respective Governments.

The catalogue which I made in my 1921 address of the principal subjects which were then being brought up as requiring international action showed the chief to have been the revision of the international sanitary conventions, the establishment of a new system by which public health administrations could rapidly exchange intelligence about the occurrence of infectious diseases, provision at the principal seaports of agreed practices for treating venereal diseases in the mercantile marine and for the destruction of rats, unification of vital statistics, and organised relief work for major epidemics, such as the European typhus above referred to.

Looking back at that catalogue, I gladly recognise its incompleteness; many more questions than were then foreseen have during this period received effective attention from the International Health Office at Paris or the League of Nations Health Organisation at Geneva. It may be regretted that the formal combination of both these organisations under the League was not established as intended in December, 1920; but it may be contended on the other hand that several events have shown the advantage of the decision that they should function separately under a specially elaborated system of liaison, and one which can at any time be reconsidered if circumstances call for it.

The main lines of this liaison were established at a conference in Paris in May, 1923, of a "Mixed Commission" (members of the provisional Health Committee of the League, in function August, 1921, to June, 1923, and of the Permanent Committee of the Paris Office), convened at the request of the Council of the League and presided over by the late Dr. Alexander Granville, C.M.G., President of the Sanitary Maritime and Quarantine Board of Egypt. The constitution of the Health Organisation of the League, as drawn up by this Commission, was formally accepted by the Permanent Committee of the Paris Office and the Council and Assembly of the League, and it is embodied, along with various subsequent resolutions of the Council, in the present organic statutes of the Organisation. In addition to a medical staff of the Secretariat, appointed by the Secretary-General, the "Health Organisation" comprises a Health Committee, whose members are appointed triennially and in their individual capacity. This committee is appointed by the Council, which, however, accepts nominations of nine of the members from the Permanent Committee of the Paris Office. The Permanent Committee of the Paris Office is by this instrument also made available for consultation by the League; and its members have the right to receive the League's medical publications and to advise as to the annual programme of work at Geneva. In practice the Medical Director of the League attends or is represented at the sessions at Paris and the Director of the Office International d'Hygiène publique those of the Health Organisation at Geneva. In 1926 other links were created by the use of the Singapore Bureau (to which I refer below), as a regional bureau of the Paris Office for information about epidemics in the Far East, and by an arrangement whereby a weekly statement about infectious diseases, supplied by Governments to the Paris Office under the terms of the International Sanitary Convention, 1926, is transmitted to Geneva and receives general publicity in the "Weekly Epidemiological Records" issued by the Health Organisation.

A consideration of much greater interest is what has been accomplished since we started on the broader road, after the war, both at Paris and at Geneva, and what encouragement we have to do more work on the same lines in future. It is with this that these lectures are mainly concerned.

As in 1921, I am anxious not to seem to claim too much either for the work on which these official international offices are engaged or for the work which they ought to undertake in future. Any suggestion that medicine, always among the most international of the learned professions, should henceforth first look to the League of Nations or any other inter-Governmental office in order to maintain its proud tradition of internationalism would indeed be retrograde. Lister, Pasteur, and Koch were all good patriotic nationals, but it goes without saying that their work was done for and taken by the whole world. In ordinary medical connexions their nationalities trouble us as little as that of the great musical composers. Voluntary and unfettered association with our colleagues in foreign countries and the British Commonwealth of Nations is vital for us. And when medicine and hygiene in the United Kingdom tend to become too insular—as they sometimes do—it is fortunate that we have the publishers and the medical journals to put us in the right way. They have, for our good, an international tradition, all the stronger because they are not officially guided or, in the jargon of to-day, not rationalised. And it is the same thing with the many congresses and conferences on medical subjects which are organised year after year by the profession itself. We all affect to regard them as a trial, but we go to them and we benefit. Governments may assist these conferences—one may mention specially those of France, Spain, Belgium, and Holland as always active in this conexion—and Government aid is a great help to their rganisers. But it is assistance with the amenities, nd in no sense implies interference with the organisa-ion, objects, or conclusions of the conference. At andom, and taking European conferences alone, I ave notes of 24 international medical meetings in 932, and 23 in 1933 down to November. They range rom small gatherings with a closely guarded member-hip, such as the Congress on Urology held in London ast year, to larger meetings like the Journées Médicales at Brussels, or the recent Cancer Congress t Madrid, which have lay as well as medical elements. This is in Europe, but we must also take account of imilar international meetings in the Americas and Congresses such as those of the Far Eastern Association of Tropical Medicines, which have so wide an influence n spreading knowledge and promoting research all through the East. In fact, if physicians, when they hear international medical work spoken of, think first of their personal association with particular gatherings of this voluntary kind, and of contacts and friendships then established with colleagues from overseas, it would be natural and fitting. Nothing could replace them.

Research workers again, as well as those concerned with certain aspects of public health administration and education, will very properly associate international medical work first and foremost with that great international body, the Rockefeller Foundation.

THE ROCKEFELLER FOUNDATION

If the Rockefeller Foundation is not strictly speaking a body designed to secure international coöperation of the kind with which I am here dealing, it is none the less an international body in the sense that it is one of its principles to distribute its work among all the nations. It is difficult to over-estimate our debt to this institution, and to the idea of the family which founded it, that some of its money profits drawn from every part of the globe should be returned so as to "promote the well-being of mankind throughout the world."

The Foundation, which as at present organised has its headquarters in New York with important branch offices, for example, at Paris and Peiping, succeeded in 1928 the "International Health Board" which had been formed in 1913, and itself arose out of the Rockefeller Sanitary Commission in hookworm in the United States which began in 1909. On the health and medical side it has two main divisions—for international work and for work on the medical sciences respectively. The latter is the more recent development, on which chief emphasis was laid in making the changes of 1928, and itself represents a stage in evolution. Beginning with giving assistance in various ways to particular practical measures of public health in suitable areas and the local demonstration of what can be done locally against particular diseases, the Foundation soon came to extend its efforts to the advancement of medical and public health education. From this it has been led to include in its programme work for the direct advancement of the medical sciences themselves and to methods of subsidising research in a way which Governments are rarely disposed to do. All these activities continue side by side, and their universal character has been maintained. The annual reports of the Foundation give abundant evidence of the large scale on which the sums have been disbursed and the wideness of the geographical distribution of the work, while, for an outline of the Foundation policy in these matters readers should consult "The Rockefeller Foundation: a Review for 1928," by Dr. George E. Vincent, published in the following year.

If reminders of the result of the work in the British Empire were necessary, we have only in London to think of the building of the London School of Hygiene and Tropical Medicine, opened in 1929, or the clinical research professorship at University College, or the assistance given to other medical schools in Oxford, Cambridge, and Edinburgh. The Dominions and India (notably by the assistance given to the All-India Institute of Hygiene and Public Health at Calcutta) furnish plenty of other examples. Teachers and investigators from the British Empire, moreover, are included among the 500 individuals from 48 countries to whom the Foundation annually gives fellowships for study in countries other than their own; while it is common knowledge that many British colonies and possessions are now actively benefiting by research work such as that conducted at the New York and other laboratories into the virus of yellow fever. If I was writing of France, Italy, or China, to take three countries at random, the examples to give would be no less striking.

This is not the occasion to discuss the many different methods by which the Foundation proceeds in the execution of the different branches of its health and medical policy, though its practice of limiting its grants to established bodies, government services, or institutions must be mentioned. In general, the Rockefeller tradition is one of freedom from political ends, international as much as national. It is no part of its programme to get together official conferences of experts from different countries, or to suggest health policies to Governments, in the way which is done by the organisations at Geneva and Paris. Nevertheless, as much of its health work is done through the Government health services, and as its activities leave hardly any region on the map of the world untouched, its indirect influence in securing good international relationship between medical workers is very great.

It is impossible also to consider international organisation in medicine without looking back to the battle of Solferino, to Henri Dunant, and so to the handful of Geneva citizens through whom the International Red Cross Committee was established in 1864. The whole Red Cross movement dates from then and the several international Red Cross Conventions have followed. Memories of Red Cross work in time of war and of the international obligations attaching to that symbol are still with all of us, while since the war there has been a notable development of Red Cross peace-time work on international lines.

THE RED CROSS AND LEAGUE OF RED CROSS SOCIETIES

The International Red Cross Committee continues its work at Geneva, and deals with the fundamental principles of the Red Cross and with the International Conventions from which it derives authority. It is a separate and independent part of the International Red Cross organisation, as defined by statutes adopted at the Thirteenth International Red Cross Conference at the Hague in 1928. Side by side with it now in the International Red Cross Organisation is the peace-time branch of the Red Cross, represented by the League of Red Cross Societies—with the creation of which, in May, 1919, the name of the late Mr. Henry P. Davison is so honourably associated. The membership of the League is restricted to participating national Red Cross Societies, now 58 in number; it has a representative Board of Governors, a small Executive Committee, meeting twice annually, and a Secretary-General, now Dr. René Sand, with headquarter offices in Paris. At present the League's principal peace work, in addition to coördination, lies with relief in times of disaster, popular health education, and the training of nurses. The League of Red Cross Societies was also instrumental in the establishment of the International Hospitals Association, and has taken special interest in matters affecting the welfare of the merchant seaman.

Health Work of the League of Nations

Where then, on lines not covered by the organisations I have described, has the League of Nations come into the picture of international coöperation in health matters? Obviously the Governments which the League represents have no particular reason to compete, or deal otherwise than by friendly unofficial liaison, with international medical congresses, with the Rockefeller Foundation or the Red Cross work. Moreover, it was settled in 1921 that the International

Health Office in Paris should continue, independently of the League, to carry on the functions of an organ which had been established under formal diplomatic agreement (1907). This was an existing body dependent on a committee which consists of technical representatives of Governments on public health questions, available and capable, within the limits of its finance, for taking up the study or regulation of any international questions affecting Government health services.

When one seeks to explain how the Health Organisation of the League, while escaping from most of the dangers of overlapping, supplanting, or superseding the work of other organisations which should be allowed to develop on their own lines, has yet succeeded in making a position for itself to which the world is ready to pay tribute, one comes at once to emphasise the following considerations :—

(1) The wide terms of its charter. By Article 23 (f) of the Covenant the States members of the League have undertaken the duty in general terms to "endeavour to take steps in matters of international concern for the prevention and control of disease."

(2) The decision taken at the earlier Assemblies, and since maintained, that a substantial sum, in recent years stabilised in the region of 1 million Swiss francs (£40,000 at the old exchange rate ; the Swiss currency remains on the gold standard), with a generous annual addition from the Rockefeller Foundation, should be allotted each year to the organisation, enabling it to be provided with a considerable medical staff under a Medical Director, who holds one of the highest positions in the Secretariat.

(3) The great post-war extension in State organisation of, or State control over, medical and public health work in almost every country in the world, which has resulted in new demands for aid with the experience of other countries. The official collaboration required is now not only the prevention of particular exotic diseases but something very much wider.

And to these I would add a fourth—namely, an active opportunism, ready to seize upon projects which have not been undertaken before from an international standpoint, to try them out, and gain experience from success or failure. In the health work done at Geneva during its first 13 years attempts to systematise and define what should or should not be done have, fortunately, not been very fruitful. The impulse has come sometimes from the administrator, sometimes from the laboratory, sometimes from the insistence of some particular Government or delegate, and sometimes again, has been essentially due to some political factor which has made it desirable in the interests of the League to show its flag and inscribe international health upon it. Dr. L. Rajchman, who has been the League's Medical Director since 1920, and whose ability is so universally recognised, has never failed to capture or provoke these impulses at a suitable moment, and to make his organisation respond to them. As a result certain lines of activity, arbitrary if you like, have become recognised as a fixed part of the Geneva work ; other undertakings have been completed, or it may be dropped or put into cold storage. In other words, it is a young, living, and still growing organism, seeking to learn and do its best to fulfil and do credit to the article of the Covenant which I have quoted.

For proof it is only necessary to look through the large number of reports and publications of the Health Organisation and observe the extensive ground which they have covered. A complete collection, I believe, exists in the library of the College and in one or two other important medical libraries in this country. Since 1931 their systematic collection has been greatly facilitated by putting the reports of Commissions and the expert studies into a Quarterly Bulletin. By taking this Bulletin, along with the records of the sessions of the Health Committee and of the Second Committee of the Assembly (which deals with the Technical Organisations of the League) and a few specially printed reports, such as that of the Singapore Bureau, the Geneva output can be appreciated as a whole.

It is not too easy to classify these activities and select examples, but I may begin with some instances of work in which the League has been able to render a definite service to medicine, and then go on to other matters in which the League has found advantage in using medical and public health knowledge to further its own objects of promoting fellowship between nations.

BIOLOGICAL STANDARDS COMMISSION

Our Therapeutic Substances Act is as recent as 1925, and it was only when that Act, and the regulations made under it, came into operation that we were in a position to exercise effective control over the purity of potency of therapeutic substances which cannot adequately be tested by chemical means. We now accept this control, both for the home product and for products coming from overseas, as part of the natural order of things, and are familiar with the exact and scientific methods by which the regulations have been prepared and are enforced through the National Institute for Medical Research and the central public health departments. But the part played by the international conferences on these questions can hardly be over-estimated. Some years before the enactment of our own legislation it had been evident that the difficulties which we were encountering were also weighing heavily on other countries. The uncertainties about the measure of potency of antitoxic sera, notably those for diphtheria and tetanus, received immediate attention after the war ; as also did the need for a better understanding of the tests to be applied to salvarsan and analogous substances. National difficulties in deciding on the admission of these remedies from foreign laboratories and doubts about the sufficiency and efficiency of purely national methods of control, found expression at the Paris Office in 1919 and 1920. It then became clear that it was only by the close association of expert workers in the principal laboratories concerned that any satisfactory agreement could be arrived at either as to tests to be applied or as to the standard substances which should be maintained in particular laboratories for international reference.

Here it was at once realised was a promising ground for the new International Health Organisation of the League, which had sufficient funds at its disposal to organise the necessary conferences and coördinate work in different laboratories. The first trial of this method, especially in relation to the antitoxins I have mentioned, was initiated by a conference in London in 1921, followed by another in Paris in November, 1922. Meanwhile, on the side of therapeutic substances requiring biological tests, another conference was prepared for and held in Edinburgh in July, 1923, when a beginning was made in obtaining a common basis for the measurement of composition, potency, and purity of such substances as thyroid and pituitary extracts, ergot, and digitalis, and another beginning with insulin. Other conferences have since followed at Geneva (1925), Frankfurt (1928), and London (1931) as well as meetings of groups of workers on special subjects at Copenhagen and elsewhere in between sessions. The report of the London conference of 1931[1] gives a useful review of the whole of the work completed to that date, and the matters then left outstanding, with some new questions like the standardisation of sex hormones, are to be considered at further conferences during the present year. All this varied work of standards has throughout been planned and kept going by a small body of experts which now constitute the "Permanent Commission on Biological Standardisation." Dr. Madsen is the chairman of this Commission, which includes Sir Henry Dale, Prof. Kolle, Dr. McCoy, Prof. Bordet, and Prof. Louis Martin. A collateral conference on the standardisation of vitamins was held at the same time under the chairmanship of Prof. Mellanby.

The Commission on Biological Standardisation thus now occupies a key position in securing reasonable and scientific control over the quality of these essential modern remedies. The British Pharmacopœia, in 1932, in dealing with substances only assayed by biological methods, now includes those alone for which the Permanent Commission on Biological Standardisation has recommended a definite standard of reference, and accepts the principle that no biological method of assay is satisfactory which does not depend on a comparison between the sample to be tested and the standard preparation. The work of providing and distributing samples of these standard preparations in this country is undertaken by the National Institute for Medical Research, and that Institute acts in several cases as the depository of the international standard itself, on behalf of the International Commission. The chief standard vitamins are thus maintained there. Other international standards are kept on behalf of the Commission at designated laboratories at Copenhagen, Washington, Frankfurt, Batavia, and elsewhere.

The spade work and the practical decisions on these different matters fall, of course, on the experts and laboratory workers themselves in their own countries. The part played by the Geneva organisation is the essential one of maintaining continuity and providing the necessary centre on which national results can be focused. By now the medical staff at Geneva has gained much experience in the arrangement of these conferences; in fact each conference brings with it a new experience, which facilitates the progress of a work which must necessarily be continuous and requires a high degree of organisation at headquarters.

INTERNATIONAL STUDY OF "HEROIC" REMEDIES

This experience indeed has lately led to the revival of a similar project—namely, to entrust to the Health Organisation of the League of Nations the duty of arranging for continued expert study of heroic remedies by pharmacologists and chemists. The International Conference on the Control of Heroic Remedies, held in Brussels in 1925, it will be remembered, fixed the quantities of particular potent drugs—morphine, strychnine, cocaine, &c.—in the standard products which find a place in the different national pharmacopœias. There can, however, be no finality either in the quantities and proportions of these substances required in medicine or in the tests applied for their determination; while the need for including new preparations has always to be borne in mind. The matter has still to be considered by the Health Committee of the League, but experience of the Permanent Commission on Biological Standardisation can without doubt be effectively urged in support of the proposal.

WORK ON MALARIA

Malaria was among the first international health questions which the League of Nations was asked to include under the terms of Article 23 of the Covenant requiring it "to endeavour to take steps in matters of international concern for the prevention and control of disease." As the British Empire, with its vast tropical territories in Africa, India, and the Far East, is more concerned with malaria than is any other group of nations in the world, it was appropriate that this country should take the initiative in requesting the League to consider it. As British representative on the League's Health Committee, on the advice of my colleague, Colonel S. P. James, I brought the subject to notice in May, 1923, in connexion with the remarkable epidemic extension of the disease which was occurring in South Eastern Europe. This resulted in the appointment of the Malaria Commission of the League under the presidency of the Italian member of the Health Committee, Dr. Lutrario. That Commission constitutes a body of experts who are well qualified to act as a central agency to which the health administrations of different countries can submit their malaria problems for information and advice, and it has made it its business to collect and analyse information from all parts of the world on the incidence, epidemiology, prevention and control of the disease. Though not in a position to undertake research work itself, it has also stimulated and coördinated national research. At an early stage "study tours" of malarious countries were made by expert members or groups of members of the Commission. During these tours information furnished by local workers and observations made on the spot were examined and discussed by malariologists belonging to varied schools of antimalarial practice and opinion. Holland, Denmark, Jugo-Slavia, Czechoslovakia, Greece, Bulgaria, Rumania, Russia, Italy, Spain, Corsica, Palestine, the United States, and India are some of the countries in which these tours of inquiry have been made.

I have spoken of the opportunism which has determined our lines of work at Geneva; and this certainly was an example of an opportunity seized at the right moment. In the years immediately following the war there were countries, like our own or the Netherlands, in which the former prevalence of malaria had been almost forgotten, but which were in the new position of receiving human carriers in abundance from the malarious war areas, while they still had no lack of indigenous anophelenes to provide the necessary insect carrier. Other countries in Europe seemed, as a result of war and post-war changes, to present the difficult problem of an increased general susceptibility of their population on the one hand, and the introduction of new and virulent strains of the malaria parasite on the other. Then also, there were countries, including new colonies or possessions, which were beginning to organise or reorganise their public health services, and finding how malaria dominated the position. However clearly it seemed to have been proved that particular areas, like the Panama Canal zone, could be freed from indigenous malaria by the systematic and thorough attack on the insect carrier through the suppression of its breeding places, and by protection against the adult anopheline, to advocate a general application of this radical measure to the malarious populations of the world—to the great river deltas, fens and marsh countries, let alone the malarious hill countries—was a mere counsel of despair. No health authority could be given the staff to do it, no administration could for a moment contemplate the expense, while half-measures on this basis were useless. It was the time, therefore, in the search for practical alternatives and practical policies, to take up wider views of malaria and its epidemiology. Why had malaria practically disappeared from Northern Europe before any of the knowledge we had from Manson and Ross? What is the extent of the natural protection conferred by attacks of malaria in infancy, and what part does natural or acquired immunity play in a malarious district? How is it that more intensive agriculture, the Italian "bonifications," and other measures for increasing the general welfare and prosperity of the people have by themselves done so much to reduce malaria? These and a host of other questions, like the prophylactic use of quinine, were going through an agitated period; controversies had multiplied, and rigid doctrines were being set one against the other. It was a service then to many countries and Governments to bring their exponents together, not merely to hammer out a least common measure of agreement or a formula, but to confront them with the problems on the spot, under differential conditions, and then see what common advice they could arrive at. It was only when this had been done in a sufficient number of instances that the Commission set itself to the general review of the principles and methods of malaria prevention published in 1927: "Principles and Methods of Antimalarial Measures in Europe" (C.H./Malaria/73), a publication which has proved invaluable by showing the many ways in which malaria can be effectively controlled, and the conditions which should determine their choice in a particular case.

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[1] League Publication III.: Health, 1931, iii., 10.

The question whether pure quinine is essential, or is only an expensive medical habit which could be abandoned for other cinchona preparations or mixtures was answered in favour of the latter. The Malaria Commission of the League has responsibility for *Totaquina*, a cheaper product in which all the alkaloids in cinchona bark are present, but standardised to 70 per cent. of crystallisable alkaloids, of which not less than 15 per cent. must be quinine. Totaquina appears in the last edition of the British Pharmacopœia and is now being used for the treatment of malaria in several countries of Europe and the Far East.

And while this work was proceeding two events of outstanding importance in the history of malaria research occurred. The first was the discovery in Germany of synthetic drugs which promise to be more effective antimalarial remedies than quinine. The second was the application in England of the clinical practice of "malariatherapy" and the study of malaria in the human subject under controlled laboratory conditions. These events quickly led to great advances in knowledge and to a radical change of thought and opinion on many aspects of the disease including methods of treatment, control, and prevention. The Malaria Commission of the League had taken no part in those events, but the Commission was there; it had proved its ability in other fields, and it was natural to seek to use it as an organisation through which the new knowledge could be sifted out and brought authoritatively to the notice of all malarious countries. Workers in the several countries where the new researches were being conducted willingly agreed to collaborate in the preparation of an agreed "international" report, with the result that a comprehensive article containing the most recent information available was published in the League's Quarterly Bulletin for June, 1933, under the title "The Therapeutics of Malaria." This comprehensive account of the subject is evidently serving a useful purpose, for it has had to be reprinted and is said to be a "best seller" among League publications. It has, at the right time, met a real want on the part of public health officers in many countries.

Mention should be made of one other matter in which the international machinery of the League has proved useful in dealing with malaria—namely, by aiding the establishment of different centres of courses of study for junior medical officers, of any nationality, who are about to undertake antimalarial work in the public health departments of malarious countries.

"APPRAISAL" IN OTHER DISEASES

The system of "appraising" data from different countries has been applied to certain other disease problems. For some of these the Secretariat has been so fortunate as to obtain the services of some one man to give the time and trouble necessary to an elaborate survey of material obtained from many countries. Dr. McKendrick's reports on the results of antirabic treatment in different parts of the world is a case in point, as also are the long and careful studies made by Dr. E. Burnet resulting in his monographs on international practice for the control of leprosy and tuberculosis. In other instances a system of "expert committees" has been followed, each with a rapporteur to do the main work. Reports on infant welfare and maternal mortality have been done in this way. In this connexion the work done, or now in hand, in relation to syphilis and cancer may be mentioned in a little detail.

WORK ON SYPHILIS

I refer below to the action initiated at the International Office of Public Health at Paris in 1920 to secure the agreement which has since been made between maritime countries for the free treatment of venereal diseases at the principal seaports. Part of this scheme was that the merchant seaman, on visiting a seaport clinic, should be given a personal card with entries, intelligible at the clinics of other ports in other countries, showing his diagnosis and the treatment he had received. Naturally, in the case of syphilis, this meant entering the results of his serological tests. At once, however, questions arose about the notation to be employed for the results of the Wassermann test and about the significance of the test when done in different ways. The same questions came up at the conference on the welfare of the Mercantile Marine at Copenhagen in 1921, when the practical application of the proposed international agreement was being considered. These were difficulties universally felt, going much further than the sailor at the port clinic. A particular clinician who was used to a particular serological notation employed by himself or by the pathologist with whom he habitually worked, could, of course, use the +, −, or ± signs in any convenient way without troubling about the actual or relative value of these signs; and he could multiply, vary, or qualify his symbols as he chose. But what was another man, out of touch with him, to make of them? Then, too, came the question of the influence of minutiæ of laboratory practice on the results of the Wassermann test, while, as the study of the subject w[illegible] and drawbacks of substituting [illegible] Georgi, Sigma, Meinicke, M.T.R.) for Wassermann methods could not be ignored. To realise the practical importance of a general understanding on all these matters one had only to consider how the welfare and the treatment of all the many cases reported to be on the serological borderline were being quite arbitrarily governed by the tester, his methods, and his notation.

These matters were taken up at successive expert conferences arranged for this purpose by the Health Section of the League in London in 1921, in Paris in 1922, and in Copenhagen in 1923. The last of these was a working laboratory conference lasting for some weeks at which representatives of eight laboratories in Austria, Belgium, Denmark, France, Germany, and Great Britain met together and tested the same 500 specimens of serum by a series of different serological tests, each in the way preferred by the experimenter. The findings of this conference as to essential details of the tests are well known, since the standard notation for reporting results which it recommended is now in general use. In 1928 the subject received further attention at a second laboratory conference in Copenhagen, on an even larger scale, cerebrospinal fluids as well as serums being tested; there has also been another important laboratory conference of the same kind in South America—in Montevideo in 1930. The whole ground covered by these conferences was reviewed as recently as October, 1932, in a report by Jadassohn, Gougerot, and Harrison, drafted by Dr. Moerch, of Copenhagen, and published in Vol. 1, No. 4, of the Quarterly Bulletin of the Health Organisation of the League. The rules therein recommended have since received a wide acceptance. It is beyond question that these laboratory conferences have been of great value in promoting improvements in serum tests for syphilis and helped to a more judicious use of them in practice all over the world. For this result special recognition should be given to the President of the Health Committee, Dr. Madsen, whose laboratory at Copenhagen has been designated by that committee as the central laboratory for reference in these matters, and to the indefatigable efforts of Colonel L. W. Harrison in this country, from the beginning of the inquiry, to maintain it at the highest level of precision in its work and exactness in its conclusions.

As with malaria, so in this case one piece of international expert coöperation led to another. This close association of syphilologists for the purpose of dealing with serum tests which are vital for modern treatment could hardly escape leading to mutual consideration of modern treatment itself. There is the greatest diversity of opinion on the amount of different remedies necessary to eradicate syphilis; treatment suffers, and may even be discredited, by these divergencies. Could not something be done by pooling knowledge? The Health Committee was persuaded to accept the challenge, and collect from a large number of countries individual case records made out on a standard plan showing stage of the disease, amount of treatment, and serum reactions before and after treatment. It sounds—indeed when first proposed it was thought to be—a fairly simple thing to do. In point of fact, the difficulties have proved considerable. With the best will in the world, busy clinicians and institutes do not find it easy to maintain special books and records over a long period; they must be fully satisfied that the analysis which results from combining their work with others will be worth having; and they are well aware that magnitude of data does not necessarily compensate for inaccuracy or error. Colonel Harrison by his energy obtained over 3000 individual records from clinics in England and Wales, and by 1932 he had seen to their preliminary examination and transmitted them to the centre chosen for global analysis under the advice of the expert Subcommittee of which he is a member. Other countries have also responded on a large scale, and it is estimated that in all something like 30,000 case records will have been sorted out for consideration by the Subcommittee when it meets this year.

RADIOGRAPHIC DIAGNOSIS OF GASTRIC AND DUODENAL ULCERATION

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(WITH ILLUSTRATIONS ON SPECIAL PLATE)

Using the opaque meal examination as it is generally carried out, it is often difficult or impossible to demonstrate gastric or duodenal ulceration on the radiogram. To H. H. Berg is due the credit for elaborating a technique by which one can show conclusively not only the anatomical condition of an ulcer but also in most cases the consecutive changes of ulceration.

In 1913 Forssell[1] published his researches into the physiology and pathology of the mucous membrane of the gastro-intestinal tract, and it is upon this basis that the technique has developed. In 1921 Akerlund[2] enunciated the principle of screen control in the radiography of the duodenum, and in 1927 amplified his method by the addition of compression. In 1925 Berg[3] applied the work of Forssell and Akerlund to a detailed study of the pathological gastric and duodenal mucous membrane, and by developing and perfecting the "aimed dosed compression" exposure technique has raised the radiological diagnosis of ulcer to a degree of accuracy and refinement hitherto unobtainable. Among others, his former pupil Albrecht[4] has amply proved the great value of the method.

THE METHOD

The "aimed dosed compression" exposure method is an attempt to demonstrate radiographically the mucous membrane of the stomach and duodenum after it has been coated with as thin a layer as possible of opaque meal. Varying degrees of compression—"dosed compression"—are applied over the stomach and duodenum to show the details of the mucous membrane to the best advantage, and at any particular moment a permanent record of the screen image is obtained by the immediate exposure of a film—"aimed exposure."

In order to carry out the method certain refinements in apparatus are necessary. A tilting couch is essential to allow of the examination of the patient in any position between the Trendelenburg and the erect. Some means of applying dosed compression must be available, and a small metal cylinder, 4 in. in diameter, with an aluminium cap, is used for compression over any particular area. It must be possible to change-over from screening to radiography in a fraction of a second.

After the preliminary examination of the thorax and abdomen the patient takes a small mouthful of the opaque meal. The examination is best begun with the patient recumbent. The progress of the meal down the œsophagus is watched and any apparent departure from the normal confirmed by aimed exposures. The entry of the meal into the stomach is carefully observed, and by tilting and turning the patient the fundus is thoroughly examined.

By bringing the couch gradually towards the erect position, the meal is allowed to trickle slowly down the stomach, the palpating hand guiding and distributing it over the mucosal surface. The stomach and duodenum are systematically explored under dosed compression. On the least suspicion of abnormality aimed exposures are made. It is only after the examiner has thoroughly satisfied himself both by screen examination and by radiograms as to the anatomical condition of the stomach and duodenum that the patient is allowed to drink the full meal. The function of the stomach is then investigated by the ordinary method.

No fixed routine can be laid down which will meet the needs of every case. A highly cultivated screening technique is essential, and it is obvious that only those who are experienced in screening and who have the necessary apparatus can make the most of Berg's aimed dosed compression exposure method.

THE MUCOUS MEMBRANE

For the proper appreciation of the method a thorough knowledge of the radiographic appearances of the normal gastric and duodenal mucous membrane is required.

If a small amount of opaque meal is taken into the fasting stomach and spread over its surface, radiographic examination shows that the mucous membrane is thrown into folds. Although great variations occur in the course of the folds, certain constantly recurring configurations, which are more or less typical, can be distinguished. The radiographic picture of the gastric mucous membrane bears a very close resemblance to the naked-eye appearance of the now classical anatomical specimen of Elze, a specimen obtained shortly after death.

From the fundus, where they are arranged as a complicated network, the folds run longitudinally through the body of the stomach. As a rule, two to four straight folds can be seen along the lesser curvature, constituting the "gastric street" or "pathway of Aschoff." On the greater curvature the arrangement of the folds commonly gives a dentate appearance because folds running from the anterior to the posterior wall are seen at right angles. At the incisura angularis the longitudinal folds tend to become curved or spiral towards the greater curvature. Towards the pylorus the folds converge in a radial manner and are continuous with the folds visible on the pylorus itself.

In the first part of the duodenum the folds are arranged longitudinally, as in the stomach (Fig. 1 on Plate), although a transverse arrangement may be visible during contractions.

The mucosal folds are not fixed anatomical structures but vary in arrangement, thickness, and width, with the needs of digestion. Forssell holds that the two main factors governing the fold formation are the variations in the fluid content of the mucosa, and the action of the muscularis mucosæ under the control of its nervous regulating mechanism, the Meissner plexus.

RADIOGRAPHIC SIGNS OF ULCER

The radiographic signs of ulcer are divisible into two groups. 1. The *direct* signs consist of the ulcer niche itself, and the late results of ulceration (organic hour-glass contraction, pyloric stenosis, and duodenal deformities). 2. The *indirect* signs are indicative of disturbance of function. A diagnosis of ulcer on indirect signs should not now be made; only the direct signs are of diagnostic importance. The radiologist must show the ulcer niche or its results on the radiogram; no more—but no less—should be expected of the radiological examination. We propose to confine our attention to the direct signs of ulceration. The interpretation and significance of the indirect signs will form the subject of a further paper.

The ulcer niche, first described by Haudek in 1910, is our most valuable diagnostic sign and is pathognomonic of ulcer. Its demonstration is certain evidence of loss of substance from ulceration. If possible it should be demonstrated in two planes, "en face" and "en profile." With ulcers on the lesser curvature of the stomach this is not generally possible, such ulcers being seen in the postero-anterior view in profile.

The "en face" niche—that is, the niche as seen from the front—is as a rule only visible after a small quantity of the meal has been taken, being hidden or indistinct when the stomach is distended with the meal. Dosed compression over the ulcer area will displace the contrast medium revealing the niche and the adjacent mucous membrane in relief (Fig. 2). Such an "en face" niche is called by Berg a "relief" niche.

The recent ulcer, seen "en face," shows as a sharply defined round or oval punched-out area surrounded by a zone of inflammatory œdema. As healing takes place the "en face" niche loses its definite outline, the circular inflammatory zone disappears, the niche becomes smaller and irregular, and there may be a radial convergence of the mucosal folds towards it (Fig. 9). Finally, when complete healing takes place, a star-shaped scar replaces the niche.

The niche having been located "en face," the patient is slowly turned under screen control until the best view of the niche is obtained in profile (Figs. 2 and 3, 9, and 10). The profile niche varies greatly in appearance, being cup-shaped in the more recent ulcers (Fig. 4), and thorn or funnel-shaped in the more chronic forms (Fig. 6). On either side of the niche there is a concave indentation of the adjacent profile. This indentation corresponds to the circular zone of inflammatory œdema surrounding the "en face" niche (Figs. 9 and 10). It is the result of œdematous swelling of the surrounding mucous membrane, of infiltrative thickening of the submucosa, or of scar-tissue formation and resultant contraction. The concave indentation on either side of a profile niche is an essential accompaniment of all ulcer niches.

Berg stresses the importance of screening and of radiography in the most varied positions in order to show the niche to the best advantage and to reveal its various characteristics. Figs. 13 to 16 show how necessary this is, and how in the case illustrated it was not until the almost lateral position was reached that it was possible to demonstrate the penetrating nature of the ulcer on the anterior wall of the duodenum (Fig. 16).

Care must be exercised in estimating the depth of an ulcer because the swelling of the mucous membrane as seen in profile may make it appear much deeper than it really is. It must be remembered that the radiogram shows the stomach and duodenum as seen from the inside, and that the outer view as seen at operation may be quite different. An ulcer shown radiographically with marked indentation of the adjacent profile may not be seen or felt from the serous side, and will be seen only when the stomach or duodenum is opened. Especially is this true of ulcers situated on the posterior wall, above all if these are situated distally in the first part of the duodenum. If some time elapses between X ray examination and operation it may be found that the operative and the radiological findings do not agree. Disappearance of the mucosal swelling and rapid scarring may have taken place in the interval, especially if medical treatment has meantime been carried out. When there is a considerable interval it is advisable to make a further radiological examination a day or two before operation to determine the presence and condition of the ulcer.

The penetrating nature of an ulcer must be diagnosed with caution. It is sometimes possible to demonstrate a narrow channel between the stomach or duodenum and the accessory pocket (Fig. 16). Many penetrating ulcers, however, will show no communicating channel (Fig. 11). Similarly the presence of a gas-bubble in a niche, or the differentiation of its contents into a barium layer, a secretion layer, and a gas-bubble, while suggestive of penetration, is by no means pathognomonic. A similar appearance may be found with an ulcer confined entirely within the gastric wall. In favourable cases the aimed dosed compression exposure method will reveal the changes resulting from penetration. The mucous membrane may show a radial pointing of its folds towards the niche, and the folds may be bent sharply away from the normal longitudinal direction sometimes at right angles (Fig. 7). If in addition there is definite fixation of the stomach or duodenum at this point, as determined by manipulation under the screen, the penetrating nature of the ulcer is clear. If the pyloric portion of the stomach is projected in the left anterior oblique or left lateral position, there is normally a perspective foreshortening. The absence of foreshortening indicates fixation of the posterior wall. A similar positioning of the first part of the duodenum shows normally a perspective elongation. If, however, the posterior wall is fixed this elongation is not apparent. These findings, associated with a demonstrable niche, make it certain that there is penetration.

Occasionally it may be possible to show the perforating nature of an ulcer. Fig. 4 shows a niche with an accessory pocket, and in Fig. 5 the same niche is shown with maximum dosed compression applied. At operation it was found that the ulcer was on the point of perforation.

Unless a niche shows the typical appearances either "en face" or "en profile," or better still in both views, there is considerable doubt as to its being a true ulcer niche. A deposit of opaque meal which does not fulfil these requirements must not, without re-examination, be regarded as due to the presence of an ulcer.

In spite of every technical improvement and of the most careful and skilled examination a small proportion of ulcers will still escape detection. It is evident that no help can be expected radiologically in the diagnosis of those ulcers which are so small and superficial that they will not retain the opaque meal. Berg holds that after a recent hæmorrhage it may be possible to demonstrate the niche, because the crater may be filled as the result of coagulation or thrombosis. Forssell holds that the mucous membrane, by virtue of its power of independent movement, may temporarily close the lumen of the niche, so that thorough palpation is necessary in order to force the opaque meal into the crater.

The modern radiological demonstration of the mucous membrane can offer no help in the differentiation of a simple chronic ulcer from a carcinomatous ulcer, unless the adjacent mucosa shows the gross changes indicative of malignancy. An ulcer which is macroscopically benign, and in which the presence of carcinoma is revealed only by histological examination, will show the radiological characteristics of a simple chronic ulcer.

The diagnosis of an ulcerating carcinoma from a simple ulcer may be difficult. In the former the niche is more irregular and does not show the definite characteristics associated with niche formation, either "en face" or "en profile." As seen "en face," it tends to have the features of a profile niche. In the profile view the smooth concave indentation seen on either side of a simple niche is replaced by an irregular moth-eaten filling defect. One has the impression that something has been taken away from the outline of the stomach, whereas a simple ulcer appears to be added to the outline. In the majority of cases the demonstration of neoplastic mucosal changes in the immediate neighbourhood will leave no doubt as to the nature of the lesion.

Certain radiological appearances may be misinterpreted as the niche of a simple ulcer. Occasionally perigastric adhesions will produce a small boss in the profile view and simulate a niche. There is, however, no concave indentation of the adjacent profile, which as we have seen is an essential accompaniment of all ulcer niches, and normal mucosal folds will be demonstrable in its immediate neighbourhood. Duodenal and jejunal diverticula and the rare diverticula of the stomach may be mistaken for ulcer niches. The demonstration of radiating folds in the stalk of a diverticulum is pathognomonic. A peristaltic wave, because of its changing position, should never be mistaken for a niche. Calcareous opacities will be projected away from the gastric and duodenal contour by examining the patient in various positions.

HOUR-GLASS CONTRACTION

Radiological examination is the only certain means by which organic hour-glass contraction can be diagnosed. Aimed dosed compression exposures show a permanent abnormal direction of the mucosal folds at the site of contraction, the folds running obliquely as if associated with some degree of rotation of the proximal upon the distal sac. A chronic ulcer is always associated with it (Fig. 8).

Organic hour-glass contraction, as seen in the specimen, is never so marked nor so extensive as it appears from the radiological examination of the filled stomach, the degree and extent of the constriction being accentuated in the latter by the additional spasm which is present. Aimed dosed compression exposures, show more truly its real characteristics, by resolving the contraction into its organic and spastic components.

The differentiation of organic from spastic hour-glass contraction is a matter of therapeutic importance. With the minimal filling of the stomach, as practised in the Berg method, spastic phenomena are much less common than with distended filling, and the demonstration of the normal mucosal relief such as accompanies spasm at once differentiates it from the organic lesion. It is also possible to distinguish a simple organic from a malignant hour-glass contraction. In the latter the line of contraction is usually in the long axis of the stomach, and the stiff, hilly, irregular relief, so characteristic of neoplasm, will be seen.

PYLORIC STENOSIS

Pyloric stenosis is the commonest and clinically the most important of the late results of ulceration. It may also result from new growth, simple hypertrophic stenosis, and adhesions.

In a well-marked case the stomach is dilated and gastric secretion may be seen during the preliminary screen examination. The opaque meal falls directly through the secretion to the bottom of the stomach and collects at the lower pole in the form of a half-moon. There is delay in the evacuation of the gastric contents, varying with the degree and duration of the stenosis.

In the earlier cases the demonstration of a duodenal or pyloric niche or of characteristic neoplastic changes in the pyloric region by aimed dosed compression exposures will determine the primary cause of the stenosis. Such differentiation is of course impossible in those cases where in spite of manipulation, waiting, and prolonged observation on the screen, none of the opaque meal is seen to pass through the pylorus.

DUODENAL DEFORMITIES

Deformity of the first part of the duodenum or "duodenal cap" may be produced by spasm from an extra-duodenal lesion, by spasm and mucosal swelling, or spasm and cicatricial contraction associated with ulcer, or by contraction of the scar-tissue of healed ulceration.

A duodenal ulcer confined entirely to the mucosa may heal without producing a demonstrable radiographic deformity. In the more chronic ulcers, where the deeper layers of the duodenum are involved and where there is always some fibrosis, a demonstrable radiographic deformity will always be present, even although the ulcer has completely healed. Thus it is obvious that although duodenal ulceration, particularly the more chronic forms, is often accompanied by deformity of the cap, a deformed cap by no means implies that ulceration is present.

The differentiation of these deformities is rarely possible by the ordinary methods of radiological examination. The exact nature of the deformity can however be definitely distinguished by the aimed dosed compression exposure method. Niche formation is the only radiological sign which justifies a radiological diagnosis of ulcer. A normal duodenal mucosal relief is evidence that the lesion is extrinsic. A deformed cap with demonstrable scarring but no ulcer niche is the result of healed ulceration. Fig. 12 shows a deformed duodenal cap with scarring from healed ulceration but no niche formation.

SUMMARY AND CONCLUSION

Berg's aimed dosed compression exposure method is the most perfect method of examination at present available for the diagnosis and investigation of gastric and duodenal ulceration. By its means the fleeting image of the screen is made permanent on the radiogram.

Only the demonstration of the ulcer niche on the radiogram warrants a radiological diagnosis of the presence of ulceration. Every niche should if possible be shown in two planes, and must satisfy the known anatomical and pathological requirements of niche formation.

In a large proportion of cases it is possible to show conclusively the perforating or penetrating nature of an ulcer.

The method is invaluable in the diagnosis of duodenal ulceration and in the differentiation of the duodenal deformities. No longer is it necessary to consider the indirect radiological signs in arriving at a diagnosis of duodenal ulcer. In almost every case it is possible to demonstrate the ulcer niche.

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LEGENDS TO ILLUSTRATIONS ON SPECIAL PLATE

FIG. 1.—Aimed dosed compression exposure showing: (*a*) *radial convergence of mucosal folds towards pylorus;* (*b*) the pyloric folds; and (*c*) the longitudinal arrangement of the mucosal folds in the first part of the duodenum.

FIG. 2.—Postero-anterior view of the stomach, showing "en face" niche with convergence of mucosal folds to niche.

FIG. 3.—Same case. Oblique view, showing profile niche.

FIG. 4.—Perforating niche on lesser curvature of stomach, showing small accessory pocket.

FIG. 5.—Same case, with maximum dosed compression applied, showing ulcer crater. Note absence of reactive changes (convergence of mucosal folds) showing that the ulcer is recent. The patient gave only two months' history of indigestion.

FIG. 6.—Chronic ulcer on lesser curvature near cardiac orifice, showing convergence of the mucosal folds.

FIG. 7.—*Ulcer of posterior wall of stomach penetrated* into the pancreas. The mucosal folds are pointing radially towards the niche and are bent sharply away from the normal direction. *The radiogram shows the* accompanying pyloric spasm.

FIG. 8.—Aimed dosed compression exposure of organic hour-glass contraction. (*a*) Points to chronic ulcer in the scar-tissue; (*b*) points to site of contraction.

FIG. 9.—Aimed dosed compression exposure of duodenal cap, showing "en face" niche with surrounding inflammatory zone, and radial convergence of mucosal folds towards niche.

FIG. 10.—Same case, showing profile niche with concave indentation of adjacent profile corresponding to inflammatory zone surrounding the "en face" niche.

FIG. 11.—Niche on posterior wall of first part of duodenum penetrated into pancreas.

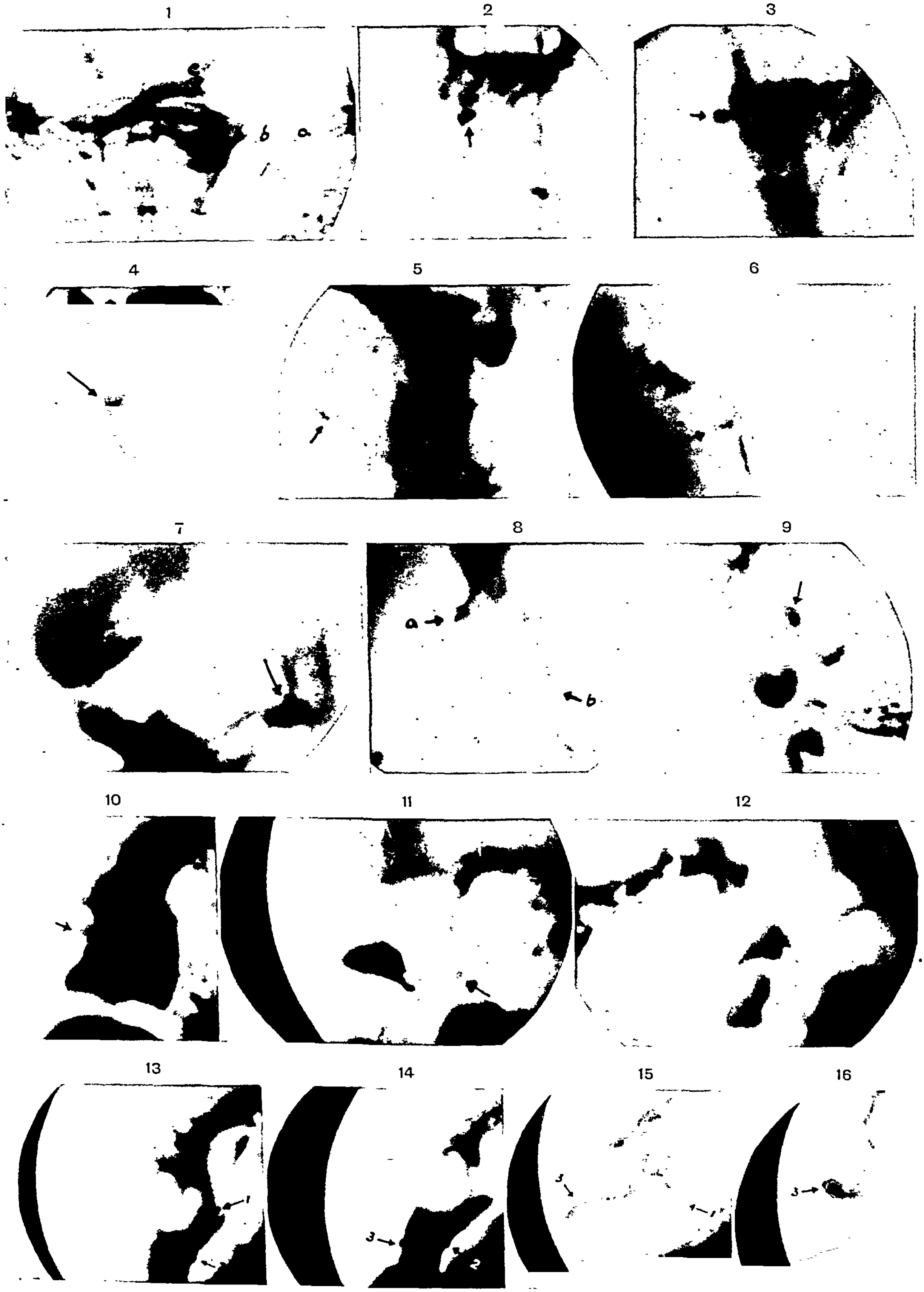
FIG. 12.—Aimed dosed compression exposure of deformed duodenal cap. No ulcer niche.

FIG. 13.—Aimed dosed compression exposure niche in *middle portion of first part of duodenum* (1) with hour-glass contraction at same level. Niche on posterior wall immediately distal to pylorus (2).

FIG. 14.—Same case, with patient slightly more rotated, showing a third niche, situated on the anterior wall immediately distal to pylorus.

FIG. 15.—Same case at different degree of rotation, showing niches 1 and 3.

FIG. 16.—Same case (patient almost lateral), showing penetrating nature of ulcer on anterior wall. The *inflammatory zone* in the region of the ulcer is well seen, as is also the communicating channel and the accessory pocket in the liver.



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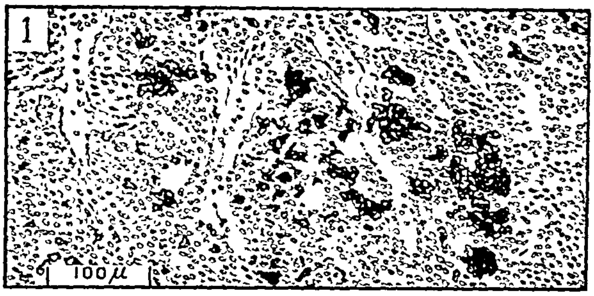

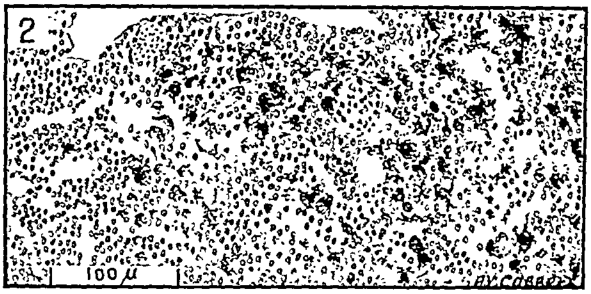

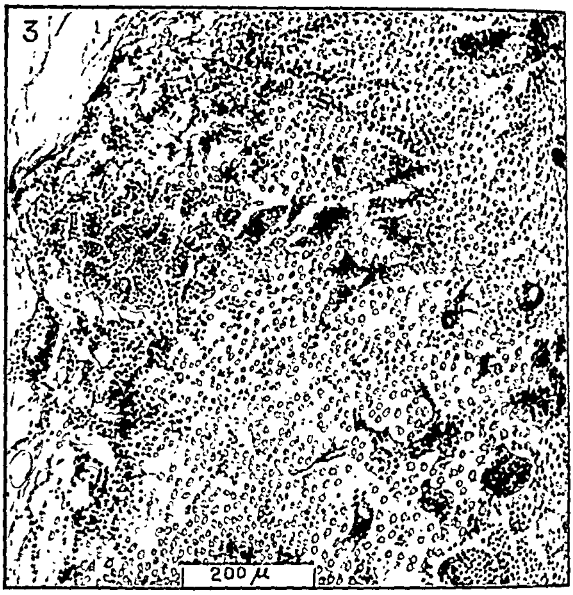

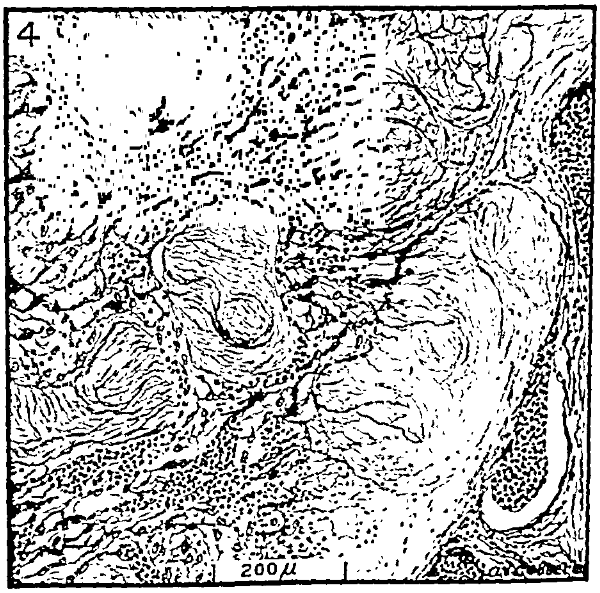

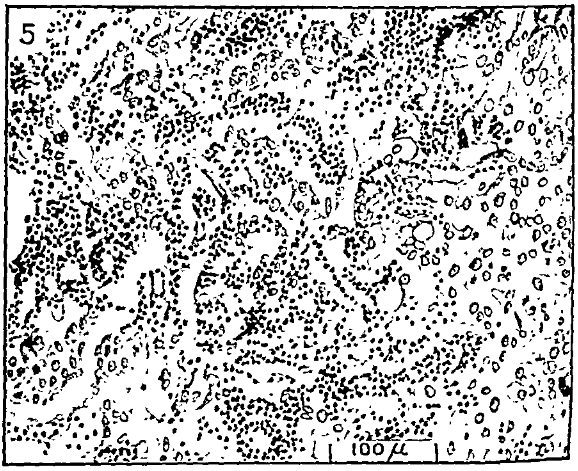

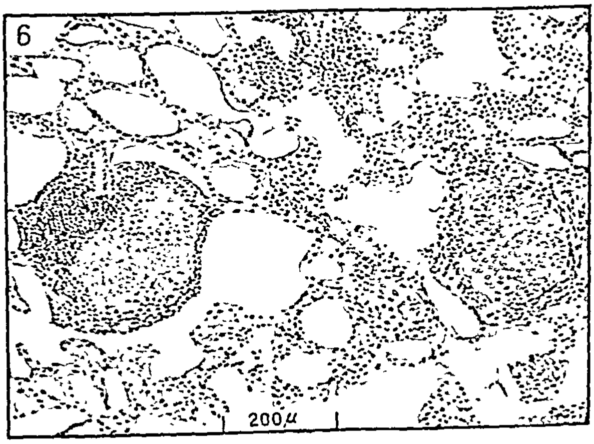

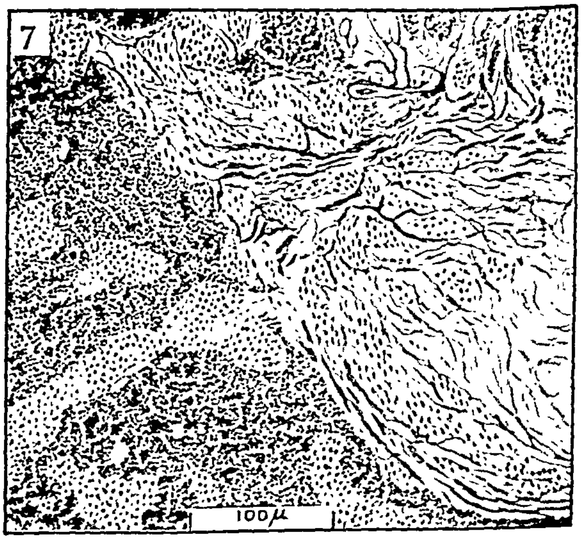

Prof. KETTLE: THE DETECTION OF DANGEROUS DUSTS

THE DETECTION OF DANGEROUS DUSTS

By E. H. Kettle, M.D., F.R.C.P. Lond.

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(WITH ILLUSTRATIONS ON SPECIAL PLATE)

It is highly important that we should be able to distinguish from among the dusts that occur in so many industrial occupations those which are capable of causing pneumoconiosis.

The inhalation of particulate matter may affect the lung in two ways. It may produce fibrosis of the organ of such a degree as to be incompatible with health or even life; and it may modify unfavourably ordinary infective processes. Both these reactions must be considered in estimating the dangerous potentialities of any particular dust, for they are not necessarily manifestations of the same property. The obvious way to determine whether a substance is capable of affecting the human lung in these ways is to test its action on the lungs of animals, but this method is not altogether satisfactory for it is laborious, expensive, and, above all, time consuming. Whatever the technique employed for the introduction of the dust into the lungs, all who have worked on experimental pneumoconiosis are agreed that the end lesion, the characteristic fibrotic nodule, cannot be produced in a few days or weeks, but only in periods measurable in years rather than months, and this makes the method of little value as a practical test.

I have shown [1] for several of the substances which are common constituents of occupational dusts that they may be divided into two groups, the active and the inert, according to their behaviour when injected into the subcutaneous tissues, and that this grouping corresponds with clinical and industrial experience. The active dusts cause an acute inflammation with necrosis of tissue and subsequent fibrosis, whereas the inert dusts give rise to nothing more than a mild and transient reaction. Further, if animals in which such lesions have been produced are infected intravascularly with tubercle bacilli, clear evidence is obtained that the active dusts determine a local settlement and proliferation of the bacilli out of all proportion to what is seen in the tissues generally and in the reactions surrounding the inert dusts. This technique provides a method for testing the capacity of a dust to modify an infection; it is perhaps less legitimate to claim that it tells us whether the same substance can produce fibrosis of the lung, for there is an obvious difference between the injection of a substance into the tissues, with all the trauma this involves, and its introduction into the lungs by the natural routes.

LEGENDS TO ILLUSTRATIONS ON SPECIAL PLATE

FIG. 1.—Section of a pulmonary lymph node of a guinea-pig killed 702 days after the intratracheal injection of iron-coated silica. The dust has been deposited in the gland and has excited no reaction.

FIG. 2.—Section of a pulmonary lymph node of a guinea-pig 467 days after intratracheal injection of wellingtonite (aluminium oxide). The dust is inert and causes no reaction.

FIG. 3.—Section of a pulmonary lymph node from a guinea-pig killed 236 days after intratracheal injection of crystalline silica. The dust has excited an active histiocytic reaction.

FIG. 4.—Section of a pulmonary lymph node from a guinea-pig killed 477 days after the intratracheal injection of finely powdered flint. The reaction has proceeded to the stage of the production of fibrous nodules.

FIG. 5.—Section of a pulmonary lymph node from a guinea-pig 236 days after the intratracheal injection of kaolin. The dust is active and is causing a pronounced cellular reaction.

FIG. 6.—Section of the lung of a rat kept in captivity in a gold mine for two and a half years. There are early cellular nodules, but these have not yet proceeded to fibrosis.

FIG. 7.—Section of a pulmonary lymph node from the same rat: the cellular reaction has advanced to the stage of fibrosis.

The action of dusts on the tissues may, however, be studied in another way which is free from this objection. It has been shown that particulate matter suspended in normal saline may be injected directly into the lungs through the trachea without producing undue trauma to the pulmonary tissues.[2] Particles introduced into the lung in this way are picked up by phagocytes just as are the particles of dust inhaled in the air, and in due course some of the dust containing phagocytes reach the extra-pulmonary lymph nodes. It is well recognised that in human silicosis the earliest lesions are found in the root glands as the result of this process, and the same thing occurs in experimental pneumoconiosis. And it does not matter how the dust reaches the lungs, for although the mode of introduction may possibly have a bearing on the pulmonary lesions, it is obvious that it can have no influence on the glandular deposits which are produced by entirely natural means.

In the course of experiments carried out during the last two or three years I have found a striking difference in the reactions occurring in the extra-pulmonary lymph nodes according to whether the material introduced into the lungs was what I have termed an active dust or an inert one. If an inert dust is injected into the lungs a certain proportion of it is carried by phagocytes to the pulmonary lymph nodes. After a time the phagocyte dies and undergoes lysis, depositing its burden in the substance of the gland where it remains without causing any tissue reaction and without exciting the attention of other phagocytic cells. If the dust is active, however, an entirely different reaction takes place. No sooner is it liberated by the death of the phagocyte than it is ingested by fresh cells which appear in such numbers as to disorganise completely the structure of the node. This activity persists, and in time collagen fibrils begin to appear between the cells. The deposition of collagen is not as a rule uniform throughout the gland, but tends to be most intense in the centres of the larger collections of dust cells. It is progressive and eventually proceeds to the formation of the characteristic acellular nodule, though this may take a year or more to develop. It is, however, quite unnecessary to wait for the end-lesion to form in the lymph nodes before arriving at an opinion as to the nature of the dust; within three months a microscopic examination of them will reveal such significant changes as to make the diagnosis possible.

The distinction between the two types of dusts is demonstrated in the following groups of experiments which I have selected from my material:—

Series 1.—A sample of iron-coated silica which previous experience has shown to be an inert dust [1] was injected into the lungs of a group of guinea-pigs; 20 of the animals died or were killed at periods between 82 and 700 days after the injection. The lungs contain plenty of the dust, but it has excited no reaction whatever. The pulmonary lymph nodes were examined in 10 of the animals; they show a considerable deposition of dust, but no cellular activity and no fibrosis (Fig. 1).

Series 2.—In this experiment the dust used was wellingtonite, another inert substance; 18 animals survived for periods between 32 and 467 days. These lungs contain dust, but show no reaction, and the pulmonary lymph nodes which were examined in 8 of the 18 cases show a copious deposition of dust but no fibrosis or cellular activity (Fig. 2).

Series 3.—In this experiment the dust used was a chemically prepared sample of crystalline silica, the average-sized particle being between 1 and 3 μ. The pulmonary glands of 11 guinea-pigs which survived for periods from 94 to 726 days after the injection were examined. They all show an active macrophage reaction (Fig. 3), and two of them from the animals surviving for the longest period show nodular fibrosis. The lungs in these animals show plaque formation and cellular nodules, but no nodular fibrosis.

Series 4.—The material used in this experiment was a sample of finely ground flint; 75 per cent. of the particles measured 0·8 μ or less; 26 animals survived for from 72 to 477 days after the injection; the lungs were examined in all of them and the pulmonary glands in 20. The lungs all show an active histiocytic reaction, and in some of them there is a varying amount of fibrosis of the infective type. In two of them killed 477 days after the injection there is definite, though early, nodular silicotic fibrosis. All the glands show an active cellular reaction, and in 4 of them examined 417, 469, and 477 days after the injection, there is pronounced fibrosis of the silicotic type (Fig. 4).

These experiments bring out quite clearly the difference in the reaction induced in lymphadenoid tissue to active and inert dusts. They are far from exhaustive, for though they have been supplemented by observations on other dusts I have not tested out systematically a large series of substances; but the results are so clear-cut, and correspond so well with those obtained by other methods of investigation, that it seems reasonable to conclude that lymphadenoid tissue reacts fairly specifically to the two main types of particulate mineral matter, and should prove a valuable test tissue for the detection of dangerous dusts.

An interesting application of the test is seen in a series of animals treated with kaolin. This is a silicate of aluminium and there is no very definite evidence that it constitutes an industrial hazard, though I have met with one case of human pneumoconiosis apparently due to it; experimentally, however, it appears to be an active substance.[1 3] The pulmonary glands of seven guinea-pigs which survived for from 163 to 505 days after the injection of this dust into the lungs all show an active reaction, though this has not proceeded to actual fibrosis (Fig. 5), and a very similar reaction is present in the lungs.

It will be noted that in the experiments recorded the lungs reacted actively to the dusts which produced changes in the lymph nodes, and a microscopic examination of them gives quite satisfactory evidence that wellingtonite and the sample of iron-coated silica worked with are inert and harmless dusts, whereas kaolin and flint are active and harmful. If the pulmonary lesions were always as distinct there would be no need to look elsewhere for our information; but, as Haynes has shown,[4] dusts which have never been regarded as dangerous may cause cellular reactions in the lungs of animals indistinguishable from the early lesions produced by silica and other substances undeniably capable of causing pneumoconiosis; and I have myself seen pleural drift, plaque formation and a moderate degree of fibrosis, that is, the accepted signs of an incipient pneumoconiosis, with such an inert substance as carbon (Indian-ink).

The danger of placing reliance on anything but unequivocal end-lesions in the lung is shown very well in experiments with iron-coated silica. The injection of this substance into the lung excites an immediate cellular response; the particles are engulfed by single and giant phagocytes and the appearances are those of an active pulmonary reaction. But in a few weeks the signs of activity pass off; much of the dust is now lying free in the alveoli, and there is nothing to suggest a subsequent fibrosis. A further advantage which the lymphadenoid tissue has over the lung when one is testing out dusts is the relative rapidity with which recognisable lesions develop in it. This is well seen in material kindly sent me by Dr. Andrew Watt and Dr. J. Pratt Johnson, of Johannesburg, from rats which had been kept underground in one of the Rand mines. The lungs (Fig. 6) show early cellular lesions but no trace of fibrosis, but the pulmonary lymph nodes show not only the characteristic cellular reaction but actual fibrosis (Fig. 7).

I have no exact information as to the earliest times at which one might expect to find positive results, for the main object of my experiments was the study of the later pulmonary lesions, and animals dying during the first few weeks have usually been discarded. Glandular lesions, however, are well developed in 94 days in the first animal of Series 3, and in Series 4 recognisable reactions are present after 72 days. It would seem therefore that three months is ample time in which to determine by this test whether a dust is active or inert.

When questions of considerable medico-legal importance are concerned, pathological evidence should be as conclusive as possible, and it may be argued that nothing short of the demonstration of its capacity to produce absolutely typical pulmonary lesions is sufficient to incriminate a dust. But this is a counsel of perfection, and it seems highly probable that a correct opinion as to the nature of a dust can be reached by a combination of indirect observations of which the one here described is by no means the least important.

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FAILURES OF GASTRIC SURGERY *

By J. A. RYLE, M.D., F.R.C.P. Lond.
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IN their decision to devote an evening to the discussion of therapeutic failures, the officers of the society are to be congratulated. I would even express a wish that this discussion may be regarded as a forerunner of others and that it may become customary to review at one session annually the limitations of our powers as healers in other branches of medicine or surgery. We know only too well that, as individuals, we commonly learn more from our disappointments than from our successes. By a pooling of unsuccessful experience we have surely a better prospect of discovering the causes of error and of improving standards of practice than by keeping it to ourselves.

Although some methods become established and perfected more rapidly than others it is clear that all true advances in therapeutics must pass through an experimental phase, in the course of which indications are sifted and technicalities developed. During this phase results are found to vary considerably in relationship with individual judgment and ability.

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* Address delivered in opening a discussion at the Medical Society of London on April 23rd.

Gastric surgery is no exception. It has evolved swiftly in the last quarter of a century, but the results have had to be waited for; immediate benefits have often given place to later disappointment; and, with a very human impatience for achievement, technique has often been cultivated more studiously than judgment. Of this there is now a wide appreciation. Our self-criticism, however, should take the form not of condemnation but analysis, and if I may be permitted, in some degree, to direct the trend of this debate I would straightaway suggest that we do not allow our remarks to degenerate into a competitive advocacy of medical measures as opposed to surgical, or of one surgical method as opposed to another, but rather that we should seek to discover patiently and dispassionately the main causes of failure, the main consequences of failure, and the best means of promoting an increase in our tale of successes in the future. There has been, from time to time, a tendency for the surgeon to decry the physician and vice versa in respect of the treatment of peptic ulceration, both parties disregarding the obvious inclination of medical failures to drift to the surgeon and of surgical failures to drift to the physician, while each remained uncertain as to the proportion of successes obtained and the types of case most successfully handled by the other. This antagonistic habit of mind is surely unbecoming and unphilosophical. In a problem so difficult there should have been collaboration, not competition, all along the line.

In considering what contribution I might make as opener of this discussion I have encountered difficulties from the outset. Not least among these was the decision as to what constitutes a failure. Let me first endeavour to answer this question, for it is one in respect of which we must find common agreement. Having thus cleared the ground I propose to consider briefly: (1) the causes of failure, other than those connected with technique, which lies outside my province; (2) the types of failure, their symptomatology and treatment; and (3) the avoidance of failure in so far as this is connected with clinical judgment and selection of cases.

WHAT CONSTITUTES A FAILURE?

Perhaps I can best reply to this question by citing certain recognised eventualities.

(1) An anastomotic ulcer developing within a year or two of an operation for dyspepsia due to an active, non-obstructive duodenal ulcer is a failure in that a worse condition than that for which the operation was undertaken has ensued, and, frequently too, in that the operation was not an essential undertaking.

(2) An anastomotic ulcer developing after an operation for stenosis (unless technique be to blame) is in a sense less of a failure, for here there was no reasonable alternative to the treatment adopted.

(3) An anastomotic ulcer following eight or ten years after an operation for duodenal ulcer, with good health intervening, can hardly be recorded in the same category as the early recurrence and is almost as entitled to be called a success as a failure.

(4) A gastro-jejunostomy complicated by a mechanical difficulty, such as vicious cycle vomiting or a "dumping" stoma, but accomplishing healing of the ulcer, is only a partial failure, but also only a partial success.

(5) Death or recurrence following gastrectomy undertaken for a very large adherent ulcer of the lesser curvature, causing serious pain and proved to be beyond the hope of medical relief, is hardly, in my opinion, to be regarded as a failure. In such cases to do nothing is unthinkable, and yet the scales are heavily weighted against surgical success.

(6) Death or recurrence or a gastrectomy anæmia following gastrectomy undertaken for a small lesser curvature ulcer or an ulcer of medium size lacking an adequate medical treatment I should regard as consequences of a grave failure of judgment.

(7) A relieving gastro-jejunostomy for an obstructive pyloric carcinoma, which gives comfort for a period of months, does not cure but is certainly not a failure.

(8) A fatal gastrectomy for an extensive non-obstructive carcinoma of the stomach, in view of the inevitable issue if no operation is performed, is not to be regarded as a serious failure, but where general rather than local symptoms predominate I am persuaded that the decision to operate in such cases often represents a failure of judgment.

Briefly I would suggest that an operation which leaves the patient immediately no better or worse than before, or which results in death in conditions which might have been cured or considerably palliated by medical means, must be regarded as a failure. In the case of recurrent ulceration after operation the degree of success or failure is partly to be assessed by the duration of good health. In cases in which operation for an ulcer has resulted in the healing or eradication of the ulcer but also in digestive discomforts or ill-health of another kind—i.e., vicious cycle vomiting, intestinal dyspepsia, diarrhœa, gastrectomy anæmia—success is clearly only of a partial kind.

THE CAUSES OF FAILURE

These may, as has been indicated, be subdivided into those due to technical error or surgical inexperience, and those due to faulty selection or judgment. Others again, but probably a minority, are due to incidental misfortunes or lack of coöperation on the part of the patient.

Faulty judgment may be held to include decisions to operate in cases in which there is no sufficient justification for surgery at all, or in which medical treatment has been given no trial or an insufficient trial, or in which the patient's general state of health or the circumstances of his life at the time make surgery an unwise procedure. Inadequate attention to the anatomical, physiological, or psychological peculiarities of the individual, any or all of which may render a case unsuitable for surgery, also leads to errors in judgment. A decision to operate for an unsuitable symptom such as hæmorrhage or too soon after a hæmorrhage is another type of judicial error. It is in respect of assessments such as these that the surgeon, employing too narrow a pathology and too concentrated upon the local aspects of treatment, has sometimes shown himself defective.

TYPES OF FAILURE AND THEIR SYMPTOMATOLOGY

I am familiar with five complications of gastro-jejunostomy deserving the qualification of partial or grave failure. These are, in order of ascending gravity and frequency: (*a*) the dumping stoma,[†] (*b*) vicious cycle vomiting, (*c*) peri-anastomotic hæmorrhagic gastritis, (*d*) persistence of the original ulcer, and (*e*) anastomotic ulcer. Anastomotic ulcers may cause a painful and often intractable dyspepsia, or again be complicated by hæmorrhage, perforation, stenosis, and (the gravest complication of all) gastro-jejuno-colic fistula.

The two important complications of gastrectomy are recurrence of ulceration and gastrectomy anæmia, which may be either of the simple or pernicious type.

The symptoms of the "dumping stoma" are flatulent discomforts and distension around the navel and below the gastric area of reference following soon after a meal. In a small proportion of cases there is diarrhœa with passage of light-coloured stools in which undigested food-particles may be recognised. In such cases a short rest after meals in the recumbent posture should be enjoined and fluids taken apart from meals.

[†] This term is used to describe a condition in which food leaves the stomach precipitately through a too patent stoma, with rapid overloading of the small bowel.

In vicious cycle vomiting there are recurring attacks of discomfort or pain with copious bilious vomiting. Such attacks may appear soon after the operation of gastro-jejunostomy and disappear later. In a small proportion of cases they persist and reoperation may become necessary. They are, I believe, a consequence of technical flaw.

Recurrent hæmorrhages after gastro-jejunostomy *without* pain or dyspepsia may be due to local ulceration or to a diffuse peri-anastomotic gastritis, a condition with which Dr. A. F. Hurst has familiarised me. Treatment should generally be medical, particular pains being taken by liberal administration of iron to combat anæmia at all times. Only in the graver cases and after a full trial of medical measures should a partial gastrectomy be considered.

In anastomotic ulceration the pain is commonly severe but very similar in type and time-relationships to the pain of the original ulcer. It is less responsive to medical treatment. The maximum tenderness is usually found one and a half inches above and to the left of the navel. Prolonged trials of medical treatment should be made before advocating further surgery, but they are much less frequently successful than in the case of a primary gastric or duodenal lesion.

In gastro-colic or gastro-jejuno-colic fistula there are added to the clinical syndrome of anastomotic ulcer diarrhœa (continuous or intermittent), eructations of colonic flatus, loss of weight and, in some cases, severe anæmia. The treatment must be surgical.

THE AVOIDANCE OF FAILURE

In so far as this depends upon other factors than technique I would urge first the importance of close attention to the age, physical and mental type, general fitness, family history, occupation, habits and economic status of the patient, and secondly, to the duration of the ulcer-history. Neither the very old nor the very young make such good subjects for gastric surgery as those in the middle period of life. In the case of young men in the twenties the ulcer is necessarily of more recent arrival, obstructive and other mechanical complications (such as anchorage of the ulcer-base) are more rare, and coöperation in the matter of post-operative caution is less easily ensured. In patients over 60 the operative risks are sufficiently greater to make the decision to perform either a short-circuit or a partial gastrectomy a more doubtful one.

A strong family history of duodenal ulcer emphasises the likelihood of constitutional predisposition, in the face of which the best surgery may fail. The lean, nervous, and anxious-minded patient—a fairly common type among the victims of duodenal ulcer—often suffers more in the post-operative phase and is more liable to retain dyspeptic discomforts. The rushed and restless business man, the doctor, and the man too much addicted to alcohol and tobacco are all, to my thinking, unfavourable types for gastro-jejunostomy, even though they may be difficult to keep well by medical means. For men of the working classes, whose cases would in better circumstances be considered more suitable for medical treatment, operations may sometimes have to be advised (even recognising the risks of failure) as they cannot afford long periods of rest or the dietaries which would be necessary as alternative treatment. Anæmia and oral sepsis or concurrent ill-health may raise the risks of surgery sufficiently to make palliative measures preferable.

The duration of ulcer symptoms is an important deciding factor. There are very few patients with histories of recurring ulcer dyspepsia of under five years, and lacking obstructive symptoms for whom I would willingly suggest an operation. Recent hæmorrhage and recurrent hæmorrhages I have come to regard as actual contra-indications to gastro-jejunostomy unless other arguments, such as mechanical complications or the large size of the ulcer weight the scales in its favour. In a Hunterian lecture in 1932[1] I referred to 12 cases of duodenal ulcer with hæmorrhage of which 9 were apparently subjected to gastro-jejunostomy on the strength of hæmorrhage. Of these 12 cases 8 bled again subsequently.

A rapid emptying time in duodenal ulcer as judged by radiology or the fractional test-meal and a high "up and down" peak of gastric acidity are to be used as arguments against a short-circuit. A slow emptying time and a steadily climbing curve of acidity are relatively favourable to a short-circuit.

Positive indications for surgery are perforation; pyloric or mid-gastric stenosis; a chronic posterior duodenal ulcer with the particular syndrome pointing to anchorage to or erosion of the pancreas; a chronic duodenal ulcer complicated by duodenal ileus; and chronic duodenal or gastric ulcers estimated to be of large size and long standing which have resisted prolonged and careful medical treatment. Even with attention to these precautions I have knowledge of three cases selected and referred by myself to surgeons of first-class experience in which secondary ulceration followed a short-circuit. Ulceration may also recur after gastrectomy and it will be some years before we can assess the final benefits of this increasingly frequent operation.

The final decision should never be based on any rule-of-thumb method, but must be made in each instance by a careful review of all the available evidence, both of a general and a local kind. So difficult may this decision be that it should commonly require the coöperation of physician and surgeon. In neurological and thoracic surgery such coöperation is generally regarded as sound and reasonable. Every operation should be followed by an adequate period of dietetic treatment and controlled by tests for occult blood in the stools. Interrupted courses of iron and a bi-weekly ration of liver or liver extract should be advised after gastrectomy.

CONCLUSION

In borrowing from my own fairly considerable experience of surgical failures, for I have mentioned no complication of gastric surgery which I have not personally seen, I may seem to exaggerate their frequency. This I have no wish to do. Actually for every ten cases of duodenal ulcer seen in private practice I see one case of anastomotic ulcer, but in all probability the frequency of this, the most important type of failure, taking all surgeons of all grades of experience, would still be less than 10 per cent.

We should not, however, be actuated in our caution solely by the numerical frequency of failures, but also by their gravity, and we must reluctantly confess that when gastric surgery fails to relieve it commonly leaves the patient in worse case than before. This cannot be said of medical treatment, however high we estimate its failures to be, excepting in so far as these failures may leave a liability to the graver accidents. It has been argued that surgery protects from dangerous complications such as perforation and hæmorrhage, but this needs qualification. I have referred elsewhere[1] to 23 cases of gastro-jejunostomy in which there had been no bleeding prior to operation and in 10 of which bleeding occurred later, and to 7 cases of anastomotic ulcer with a history of previous duodenal perforation, in 3 of which perforation had occurred again.

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[1] THE LANCET, 1932, i., 327.

The triumphs of surgery are more complete and lasting than those of medicine, but, by the very nature of the risks taken, the failures of surgery are also more complete and more lasting. Excepting therefore in urgent or obvious situations the responsibility of deciding upon operation must remain a serious one and should require every contribution we can muster from balanced experience and prognostic insight. Improving technique has greatly diminished the immediate mischances of gastric surgery. Improving clinical judgment and physiological studies should ultimately help to eliminate or greatly diminish those mischances which follow at a later date.

FAILURES OF GASTRIC SURGERY*

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THE days when a surgeon only required to know how to operate are long since past, and now one of his most important functions is to decide when to operate. Every operation that is unnecessarily performed is a surgical failure yet, in spite of the close coöperation between physician, laboratory worker, and surgeon, such failures are only too frequent. In gastric surgery they fall naturally into two groups.

Errors of diagnosis.—If an operation has been performed in the belief that a gastric or duodenal ulcer or a gastric carcinoma is present and the expected lesion is not found, surgery has failed at its very inception. The underlying condition is not improved and is often made worse. The patient has been subjected to a definite risk of life, to a period of some days of grave discomfort and pain, and to a further period of some weeks or more of limited activity. His life and work have been gravely disturbed and to a varying extent he may have been financially embarrassed. Yet there is no surgeon who can honestly state that he has been free from this fault. It is true that to-day we no longer hear the suggestion made that the symptoms are anomalous and it would be better to look inside and see what is wrong, and but rarely are we told that medicine has failed and that surgery had therefore better be tried. Very few surgeons will now consent to operate unless there is very strong evidence of the presence of an organic lesion which can only be cured by operative measures, but our knowledge is still so incomplete that errors in diagnosis are even now made and the abdomen unjustifiably opened.

The error most frequently occurs when the presence of carcinoma is suspected, and here perhaps the mistake is more pardonable. for the disease, if left too long—and often indeed, if left until the diagnosis is certain—becomes inoperable, so that operation upon suspicion alone is often justified. Moreover, the settlement of all doubt and the relief to the patient from his dread suspicion may do much to set him on the road to recovery. It is difficult to estimate with any accuracy what number of cases are so operated upon, for most surgeons, myself included, index their cases under proved lesions and do not keep any list of their suspected duodenal or gastric lesions, although they are often entered up on the individual notes.

I find, however, that in my statistics which were last analysed in August, 1933, I have operated upon 2172 proved gastric lesions and upon 171 cases which have been indexed as gastritis, or some other non-surgical gastric lesion. That is to say, in a series of 2343 operations there was a percentage of 7·2 errors of diagnosis (Table I.).

TABLE I.—*Errors of Diagnosis*

		Errors.	Per cent.
Total operations ..	2343	171	7·2

Operative Mortality

	Total.	Deaths.	Per cent.
P.G.E. for duodenal ulcer	703	14	2*
P.G.E. for all uncomplicated lesions ..	846	25	2·9
Wedge resection for lower curve ulcers..	272	12	4·4

* Includes series of 283 with no death.
P.G.E. = posterior gastro-enterostomy.

Although most of these were operated upon in the belief that carcinoma was present, yet the percentage is much too high.

Operations for medical lesions.—The second serious error is to perform an operation for a lesion which could be cured medically. In all patients the fear of operation is a very real one, and those of us who have been honoured by having many doctors among our patients will realise that this is not limited to the ignorant. The figures of such cases are, however, not assessable, for they are very largely a matter of personal opinion. Many physicians believe that they are much higher than do the surgeons, and probably Dr. A. F. Hurst, for instance, would place them a good deal higher than I should ; but the two branches are to-day approaching agreement on this point, and it is now generally accepted that all early ulcers should be treated medically, that all chronic ulcers if uncomplicated should be given a trial of medical treatment before surgical intervention is sought, that the more unsuitable the patient for operation the longer the trial, and that as a general rule the shorter the history of gastric symptoms the greater the probability of carcinoma. and therefore the sooner should surgical intervention be undertaken.

Because of our wider knowledge of the after-results and the closer coöperation in the work of the physician and surgeon, we much less frequently see to-day operations performed for visceroptosis, for chronic colitis, and other lesions which can be more readily relieved by medical measures. In the same way gross errors of diagnosis and treatment, such as the performance of gastro-enterostomy for tabes dorsalis, chronic uræmia, and the vomiting of pregnancy very rarely occur.

OPERATIVE MORTALITY

Even to-day there is no operation which is free from risk and in every case this risk must be balanced against the danger of the lesion. Such a balance can only be arrived at after wide experience and a full knowledge of the patient's general health. The teaching that a given lesion must be treated by a certain operation is useful for the undergraduate but is futile in practice. The risk will depend upon the age of the patient, the presence of local or general complications, and the experience of the surgeon. If the first two are advanced and the third is retarded the risk of operation may easily exceed that of the lesion, and therefore either no operation should be performed or some palliative measure should be executed. This variation in the patient's risk is well exemplified by the curious experience of many surgeons that their mortality-rate rises with their experience. The explanation lies in the fact that an increasing proportion of patients who are aged, who are excessively fat, or who have some other counter indication to operation are sent to them for treatment. In spite of this the basis of analysis must be a knowledge of the mortality in different series operated upon by the individual surgeon. The larger the series the more accurate the figures, for both good and bad risks are more likely to be included. An enormous number of such figures have been published. Surgeons especially skilled in this branch of work have reported remarkably low mortality-rates, whereas the opponents of operation have collected statistics of operations performed, perhaps by many surgeons, which show a much higher mortality. With a discussion of the value of these figures I do not propose to weary you, for this has been done on frequent previous occasions. I shall simply mention a few figures obtained from the study of my own statistics which were analysed up to August, 1933. These figures, as already mentioned, comprise a total of 2172 gastric operations.

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* Contribution to a discussion at the Medical Society of London on April 23rd.

The operation which is most frequently criticised to-day is that of gastro-enterostomy, for many claim that it is associated with a relatively high mortality and is followed by a grave risk of after complications. It will be seen, however, from my figures (Table I.) that in 703 cases of duodenal ulcer the mortality was only 2 per cent. and these cases included a consecutive series of 283 operations without a death. Even when performed for lesions other than duodenal ulcer its mortality only rises to 2·9 per cent., so that the dangers of operation are not excessive and in my experience do not in any way equal those of hæmorrhage and perforation in patients who have had no operation. Ulcers of the lesser curve of the stomach carry with them a rather higher operative mortality, as is well recognised, and in 272 of these patients treated by wedge resection and gastro-enterostomy, which to my mind is the operation of choice, there were 12 deaths, a mortality of 4·4 per cent.

It must always be remembered, however, that these figures, although relatively low, must in a sense be regarded as an added risk to the disease. It is but little consolation to a patient's relatives to know that a serious risk which might eventuate in two or three years' time has been completely removed if the patient dies shortly after operation.

OPERATIVE RESULTS

Before discussing the individual causes of post-operative failure it is necessary to know the percentage of cures. This can only be estimated by investigating a considerable number of cases. As with the operative mortality, diversity of opinion has led to much criticism of published statistics. I will therefore make no attempt to discuss the published results, but will only show you some of my own figures and will lay stress upon the fact that a patient who is described as a cure is one who can eat anything and can continue his daily work. Many of the patients who attend my follow-up department are dock labourers and stevedores, who have for their mid-day meal meat and bread with perhaps an onion and a piece of cheese, and if unable to partake of this diet cannot continue their work. They have no opportunity of living upon the diet which is so often insisted upon for those who have obtained a medical cure. In determining whether the patient has reached this standard it is, of course, essential that his progress has been watched for a considerable time, and for this reason the preparation of statistics of after progress is always a laborious work. I shall give you the figures I published for the collective investigation of the British Medical Association, for this series of cases was watched for a minimum period of five years, the longest period being nine years. Of 172 duodenal and pyloric ulcers treated by gastro-enterostomy, 84·9 per cent. of all cases, or 88·8 per cent. of those followed, were cured. In 67 cases of ulcer of the lesser curve treated by a wedge resection, the figures were somewhat higher, being 88 and 92·18 respectively. The partial gastrectomies were associated with a higher mortality, so that the figures were 70·2 and 74·2 respectively (Table II.).

TABLE II.—*Five-year Cures after Operation*

	Total.		Per cent. of *all cases.*		Per cent. of *followed cases.*
P.G.E. for pyloric and duodenal ..	172	....	84·9	....	88·4
Wedge resection for lower curve ulcers	67	....	88	....	92·1
Partial gastrectomy	37	....	70·2	....	74·2

P.G.E. = posterior gastro-enterostomy.

It has been necessary to lay some stress upon the successes before considering the failures, for there are very definite and well-recognised failures which occur in the hands of every surgeon and which at present it is difficult to prevent. To-day great stress is being laid upon them and there is a danger of their frequency and importance being exaggerated and the real use of these valuable operations being overlooked. Therefore in any discussion such as this, which is mainly limited to a consideration of the failures, it is well to keep constantly in mind that they form but a small proportion of the total.

Probably every surgeon has from time to time met with the rare examples of failure due directly to errors of technique or to rare accidents. The former, among which may be mentioned such gross errors as uniting the stomach to the lower ileum or even to the transverse or pelvic colon, making an opening which is much too small, allowing the afferent loop to become constricted by the mesocolon, placing the anastomosis on the wrong side of an hour-glass constriction or uniting the posterior wall to the anterior, are with increasing knowledge becoming extremely rare. They are failures not of gastric surgery, but of grossly incompetent gastric surgery. Post-operative hæmorrhage is also probably due to errors of technique which, however, are less evident and thus less easy to avoid. Among the rare accidents may be mentioned herniæ through the opening of the mesocolon or behind the afferent loop and retrograde intussusception through the gastro-enterostomy opening. The former may be prevented by careful technique, but the latter, although very rare, seems to occur even when the operation has been most carefully performed.

Considerable discredit is falling to-day upon gastric operations owing to certain complications and failures which have been much discussed. These are four in number, and it is to them that our attention must be mainly directed. They are: (1) gastro-jejunal ulcer, (2) recurring ulcer, (3) subsequent development of carcinoma, and (4) post-operative anæmia.

GASTRO-JEJUNAL ULCER

The frequency of this serious and dangerous complication has been much discussed. Many physicians seeing chiefly the failures after gastro-enterostomy believe that it is a common event. Hurst states that it is a frequent and dangerous sequel to gastro-enterostomy after duodenal ulcer, and that the number of marginal ulcers slowly and steadily increases the longer the cases of gastro-enterostomy are watched. He quotes the remarkable series published by Lewisohn in 1925 of 68 cases of gastro-enterostomy, 34 per cent. of whom later developed this complication. Similar though not quite such extreme views are held by many surgeons, especially those on the Continent, and for this reason they have given up gastro-enterostomy in favour of partial gastrectomy. On the other hand, surgeons who have carefully watched their cases have shown that the incidence is somewhere in the neighbourhood of 3 per cent. It is manifestly impossible here to enter fully into these much-discussed figures. This I have done in a communication, an abstract of which I am giving at the meeting of the Association of Surgeons and which I hope will later be published in full. I have for this purpose analysed my cases up to August, 1933, and have arrived at certain very definite conclusions which may be summarised as follows and which are based upon the figures shown in Table III.

TABLE III

Total cases 2172.
Marginal ulcers (with local resection) 18. Recurrences 6.

		Gastro-jejunal ulcers and per cent.	
Total cases	2154	31*	(1·4)
G.E. and gastrectomy	1859	31	(1·6)
Posterior G.E.	1313	29	(2·2)
Gastrectomy	469	2	(0·43)
Duodenal ulcer	893	29	(3·24)
Duodenal ulcer watched 10 years	457	18	(3·9)
Gastric ulcer	683	1	(0·14)
Carcinoma	221	0	(0)

* One recurrent.
G.E. = gastro-enterostomy.

1. Gastro-jejunal ulceration is only common after gastro-enterostomy for duodenal ulcer.
2. It occurs after 3–4 per cent. of all such operations.
3. It is much more common in males.
4. It is directly due to hyperacidity.
5. The hyperacidity is congenital and possibly a familial fault.

The mortality of gastro-enterostomy should not exceed a maximum of 2 per cent., whereas after partial gastrectomy it is very seldom less than 6 per cent. Thus the mortality of the latter operation is greater than that of gastro-enterostomy together with the incidence of marginal ulceration, and it is not justifiable to replace gastro-enterostomy by partial gastrectomy, which should be used only for the few cases which have developed a marginal ulcer.

The greater frequency in males has long been recognised. In the 30 cases following my own operation of gastro-enterostomy there was only one female. In 49 further cases in my series where the gastro-enterostomy was performed elsewhere there were 6 examples. The reason why these ulcers are almost entirely limited to males in whom a gastro-enterostomy has been performed for a duodenal ulcer has now been proved to be due to the fact that in such patients there is a much higher acidity. At one time it was thought that errors of technique such as the use of a button, of unabsorbable sutures, or of clamps was the exciting cause. Such may increase the incidence, but they are only a contributory factor. If there is a high acidity the ulcer may develop in the absence of such factors. Although not entirely absent after partial gastrectomy, they are less frequent as this operation brings about a greater reduction of acid. The careful experimental and clinical work which has proved that a high acidity is the cause is too long to discuss here, but on the clinical side we owe most to the work and writings of Hurst. My own figures, as shown in Table IV., entirely support this view. Hurst also shows that not only is hyperacidity a congenital fault, but there is often a family history not only of duodenal ulcer but of gastro-jejunal ulcer following gastro-enterostomy. It would appear that this extreme degree of the hyperæsthenic gastric diathesis is present as a congenital fault in some 3–4 per cent. of all cases of duodenal ulcer.

TABLE IV.—*Average Test-meals*

		Cases.	Average free HCl.	Average total acid.
Lesser curve	Females	57	0·108	51
	Males	135	0·123	61
Duodenal	Females	44	0·136	57·6
	Males	213	0·165	63·5
Duodenal, later gastro-jejunal		13	0·19	71

Because of this underlying fault any form of local operation or any method of undoing the gastro-enterostomy is useless in the treatment of these ulcers. The only operation that holds out any hope of success is a partial gastrectomy, sufficiently extensive to reduce the acidity. It is a serious and irksome operation and associated with a high mortality, but in dangerously ill patients a temporary palliative operation may be performed and the gastrectomy carried out later when the patient's condition has improved. By a careful selection of such cases and experience in the operative technique the mortality can be greatly reduced. In my last series of 20 cases there was only one death.

RECURRENT ULCERATION

At one time there was much discussion as to the value of gastro-enterostomy in the treatment of ulcers of the body of the stomach, but it is now generally agreed that this method is not sufficient. It is true that some very large ulcers found in patients who are dangerously ill from hæmorrhage, or vomiting, or continued pain, are entirely cured by a gastro-enterostomy which was performed as a palliative measure, but a considerable number, especially of the penetrating ulcers, still persist. In my own series there were 117 cases of lesser curve ulcer treated by gastro-enterostomy alone, and in five of these the ulcer persisted (Table V.). Of greater interest are the cases where new ulcers arise after a gastro-enterostomy. I have for long upheld the view that duodenal ulcers do not persist or recur after a properly performed gastro-enterostomy. I have never yet met with such a case where the stoma was functioning and was accurately placed. I believe that most of the cases described as such recurrences are really gastro-jejunal ulcers. The cases to which I refer now are those in which the ulcer develops on the lesser curve after the performance of a gastro-enterostomy for duodenal ulcer. Such cases are rare (Table V.), there being only 4 in a total of 865

TABLE V

		Total.	Recurrent ulcers.	Carcinoma.	Severe anæmia.
G.E. for	duodenal ulcers	865	4	6	0
	gastric ulcers	117	5	1	0
G.E. and resection for gastric ulcers		325	6	5	1
Partial gastrectomy		469	0	0	5
Suture for perforation		—	32	—	—

G.E. = gastro-enterostomy.

gastro-enterostomies for duodenal ulcer, but the mere fact that they can arise is the strongest argument against the routine use of gastro-enterostomy alone for lesser curve ulcers.

Another interesting group of cases is that in which an ulcer persists after simple suture for a perforation. I have long maintained that the majority of perforations occur with chronic ulcers, for in nearly all my cases a prolonged history had been obtained, and of a series of 42 perforations examined post mortem 41 were definitely chronic ulcers and one was doubtful. Nevertheless many surgeons claim that most of the perforations occur with acute ulcers and that a simple suture is alone necessary to bring about a cure. As with so many other points in gastric surgery this matter has given rise to much discussion, but that many ulcers do persist in spite of simple suture is beyond all question. In my own series there have been 32 cases where a simple suture was performed elsewhere, but persistence of the symptoms necessitated further operation. I have no means of determining the percentage of such persistence, for I do not practise suture alone as a routine method. Many similar cases have, however, been reported by other surgeons. Although my experience therefore favours the view that most of these ulcers are chronic, it must not be thought that I would advocate the routine performance of gastro-enterostomy on all occasions in cases of perforation. If the patient's condition is sufficiently good I should undoubtedly carry it out at that time, but if he is gravely ill and there has been flooding of the peritoneal cavity, a simple suture alone should be performed: but the important point is that under such conditions the patient should never be told that he is cured, but should be carefully watched and a further operation advocated if the ulcer persist. In nearly all such cases that I have seen where this course has been followed a later operation has been required.

SUBSEQUENT ONSET OF CARCINOMA

The relationship of carcinoma to chronic gastric ulcer has always been a vexed question. Its onset has not only been reported after gastric operations other than partial gastrectomy but the frequency of this complication has been regarded as another reason for the substitution of gastro-enterostomy or local excision by a partial gastrectomy. Paterson [1] discussed this question in 1926 and stated that in 493 of his cases 2·5 per cent. were said to have died subsequently of carcinoma. He found, however, that many of these cases were doubtful, and that he was only able to find one case in which the carcinoma was undoubtedly gastric, and in that case it had not occurred at the site of the ulcer.

In my own series there were 1307 cases treated by gastro-enterostomy with or without resection of the ulcer, and in this series there were 12 cases (0·91 per cent.) which subsequently developed carcinoma. These, however, fall into three distinct groups. There were, firstly, those in which a gastro-enterostomy was performed for an ulcer so large and so adherent that a partial gastrectomy was considered unwise, and in which, although at the time of the operation the lesion was considered to be benign, yet the evidence of carcinoma developed so shortly afterwards that there could be no doubt that the ulcer was carcinomatous at the time of the operation. In such cases the lesion was manifestly inoperable, and even if a partial gastrectomy had been performed recurrence would certainly have followed. These cases are, therefore, no indication for the replacement of gastro-enterostomy by a partial gastrectomy.

In the second group a gastro-enterostomy is performed for an ulcer in the duodenal or pyloric region, which ulcer is apparently healed, and after a period of varying time a carcinoma develops in some part of the stomach remote from the primary lesion. Such a carcinoma is no more prone to occur in these cases than in normal persons, in fact, it is probably less so, for these patients have a hyperchlorhydria, while carcinoma, as the work of Hurst tends to show, is more prone to occur in those who have hypochlorhydria. Hence to suggest that a case of duodenal ulcer should have a partial gastrectomy performed in order to prevent the later onset of carcinoma, is even less sensible than to suggest that all normal persons should have such an operation lest at a later date they develop carcinoma, or that all young women should have a hysterectomy lest they develop carcinoma of the cervix. In my own series there were 3 such cases, the carcinoma occurring 3, 15, and 17 years respectively after the gastro-enterostomy (Table VI.). The remaining group comprises those cases in which the carcinoma occurs in the same area of the stomach in which the ulcer was situated, and although it may arise many years afterwards, it is fair to assume that it originated in the scar of the old ulcer. The carcinoma may be situated either within the pyloric region or on the lesser curve and sufficient time has elapsed to make it certain that it was not present at the time of the first operation, and thus its onset would have been prevented if a partial gastrectomy had been performed. In my own series there were five cases which were placed in this group, and although in three of them a second operation was not performed, either the site of the tumour as found on clinical examination or the X ray appearances suggested that the scar of the old ulcer was involved in the carcinoma. But even if they all belong to this group there were only five cases in a series of 1307 gastro-enterostomies, that is a percentage of 0·37, so that the risk of this complication cannot be considered as great. These five cases occurred 4, 4, 5, 6, and 6 years respectively after the first operation. It will be noticed (Table V.) that there were no cases of carcinoma following a partial gastrectomy.

TABLE VI

Total cases	1307
Total carcinoma	12 (0·91 %)
Present at first operation	4
Remote from site of ulcer	3
Occurring at site of ulcer	5 (0·37 %)

POST-OPERATIVE ANÆMIA

Of late years much has been added to our knowledge of anæmia, and it is now realised that Addisonian or pernicious anæmia is due to the absence of a substance formed by the action of a constituent of the gastric juice upon the protein of beef muscle. It would therefore be expected that this form of anæmia would occur after complete gastrectomy and, in fact, Moynihan pointed out as far back as 1911 that this complication did occur. It has since been realised that it may also be found after a partial gastrectomy and even after a gastro-enterostomy, although the explanation of this occurrence is not so simple. Many cases of anæmia following gastric operations are found, however, not to be of the macrocytic or pernicious type, but to be simple or microcytic and due to the absence of available iron. The frequency of these two types has been much disputed. Rowlands and Simpson [2] collected 15 cases of the Addisonian type from the literature and added

2 more of their own. Of the 17, 5 occurred after total gastrectomy, 8 after partial gastrectomy, and 4 after gastro-enterostomy. Gordon-Taylor[3] found 8 cases of mild anæmia and 15 of severe after 52 partial gastrectomies, but these did not resemble the Addisonian type. Morley[4] also found that 12 out of 21 Polya operations developed anæmia, but none occurred after the Schoemaker operation. Vaughan[5] collected 122 cases of anæmia, which had been fully investigated, following gastric operations, but achlorhydria was not present in all of them. Hurst[6] collected five cases of undoubted macrocytic anæmia, but states that although this variety is rare the simple microcytic anæmia is quite common. There is no doubt that mild forms of anæmia are not uncommon after a partial gastrectomy, but the frequency of the more severe types is uncertain. It is possible now that this more extensive operation is being so widely performed, especially on the Continent, as a routine operation for all gastric lesions that a large number of severe anæmias will soon have to be treated. It has also been very noticeable in my follow-up department that when a partial gastrectomy has been performed for a lesion which was associated with severe hæmorrhage previous to the operation that the anæmia may take a very long time to improve, but the majority respond in time to large doses of iron. In my own experience the condition is very rare after gastro-enterostomy (Table V.), there being no example after 982 operations. There was one case following 325 local resections and five cases in a group of 469 partial gastrectomies. These cases were all of the microcytic type.

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Clinical and Laboratory Notes

THE TREATMENT OF SCHISTOSOMIASIS WITH ACRIFLAVINE

By A. C. Fisher, M.B. Brist., F.R.C.S. Eng.

RESEARCH WORKER UNDER ROYAL SOCIETY GRANT AT BAPTIST MISSIONARY SOCIETY HOSPITAL, YAKUSU, HAUT CONGO BELGE

The possible utility of acriflavine in the treatment of schistosomiasis, suggested itself to me during some in-vitro experiments, in which it was found that this drug was rapidly lethal to the bilharzial cercaria in high dilutions in the presence of human blood-serum. The value of acriflavine in general medicine and surgery is so well known that it need not be touched on here. The fact that it is readily absorbed when taken by the mouth would make it a valuable weapon against schistosomiasis were its specific properties proved.

The cases treated in this series were all of a type of schistosomiasis found in the Stanleyville district of the Belgian Congo, where intestinal bilharziasis is caused by a parasite of the *hæmatobium-bovis* group whose peculiarities are now being studied. The series comprises 52 cases; of these 30 were under twelve years of age and the remainder ranged up to forty. The sexes were about equally represented. The first two patients treated received intravenous injections of acriflavine, but in all subsequent cases the oral route was used exclusively. The course consisted of five doses given on consecutive days, and the drug was given in a 2 per cent. aqueous solution, on an empty stomach, at least an hour before the next meal. In cases where dysentery was absent it was found that a daily purge made the treatment more efficacious. The dosage was regulated to age and weight according to the following scale:—

Children weighing 20 kg. or less were given a total dose equivalent to 0·02 g. per kg.

Children weighing 30 kg. were given a total dose equivalent to 0·015 g. per kg.

Adults weighing 60 kg. or more received a total dose equivalent to 0·01 g. per kg., with a maximum dose of 0·7 g.

Of the 52 cases in the series, 13 continued to show ova in the fæces unchanged. Of these 11 were small children who had received a total dose equivalent to less than 0·012 g. per kg. of body-weight. The remaining 39 cases became symptom-free in less than three days, and ceased to show any but degenerate eggs in the stools within the week. The first two cases treated were under observation for two months without the recurrence of symptoms or the reappearance of schistosome ova in the fæces. No toxic manifestations were observed in any of the patients treated, nor have any unpleasant sequelæ been encountered.

The results recorded in this preliminary note seem sufficiently good to justify acriflavine being given a more extensive trial in the treatment of the three types of human schistosomiasis.

VULVOVAGINITIS IN CHILDREN

By C. Paget Lapage, M.D. Manch., F.R.C.P. Lond.

PHYSICIAN TO THE ROYAL MANCHESTER CHILDREN'S HOSPITAL AND CHILDREN'S DEPARTMENT OF ST. MARY'S HOSPITAL; LECTURER ON DISEASES OF CHILDREN IN THE UNIVERSITY OF MANCHESTER

Chronic vulvovaginal discharge is not uncommon in young girls under the age of 14, and may lead to much discomfort, mental and physical, to the child and the mother. Often, but not always, a swab shows the primary infecting organism. In some cases the discharge appears to be simply one of other chronic catarrhal states of the mucous membranes in a debilitated child and might be put in the same category as chronic catarrh of the nasopharyngeal mucous membrane or the respiratory or gastro-intestinal tracts. The nature of the infection is therefore not always clear, and a swab may simply show a mixed infection.

Again, infection with the most intractable and pathogenic organism of all, the gonococcus, is not always easily demonstrated because the swab in chronic cases may show many pus cells but no clear evidence of the organisms. The gonococcus offers a prolonged resistance to treatment and the diseases it produces may be devastating in their effects. Consequently it is much the most to be feared. The *Bacillus coli* is frequently found in the swabs but is not necessarily causative.

The bacteriological results, however, are not the only important criteria for treatment. The volume of the discharge, its persistence, and the mental and physical state of the patient are enough to determine the need for treatment. Ordinary methods such as swabbing, gentle irrigation with antiseptics, and even searching douching with ballooning of the vagina are not always effective.

G. C. Schauffler[1] describes a new method of treatment with a 1 per cent. silver nitrate ointment made up with anhydrous wool fat. Small metal tubes (collapsible) are filled with the ointment and a piece of rubber tubing is attached to the nozzle of the tube. This rubber tubing nozzle is inserted into the hymenal opening of the vagina and the ointment is injected by pressure on the metal tube from the bottom. The injection is painless and none of the cases treated at hospital have complained of any after-effects or local irritation. The results are very encouraging, as will be seen from the following records :—

CASE 1, aged 6½, had had vaginal discharge for ten months, being treated for general debility. A vaginal swab was negative for pus, albumin, and gonococcus. From July 4th–22nd, 1932, 1 per cent. silver nitrate ointment was injected into the vagina daily for the first week, then every second day for a week, and twice during the third week. The vaginal discharge had decreased considerably after two treatments and had disappeared by the end of the first week. There has been no return of the condition. Swab was negative on May 24th, 1933. There was a recurrence in August, 1933. Six daily treatments and three treatments on alternate days were given, and there was no recurrence up to November, 1933.

CASE 2.—A child, aged 12 years 9 months, had had for several months a vaginal discharge associated with vague abdominal pains. A vaginal swab showed pus and coliform bacilli. She was given a similar course of injections to that of Case 1. The discharge had disappeared by the end of the second week. There was slight return of the discharge three months after the treatment but the condition cleared up without any further injections. Another slight recurrence appeared in March, 1933. A swab was negative for pus, albumin, and gonococcus in May, 1933. Up to November, 1933, there had been no return of symptoms.

Nine cases have been treated. Many of them have now been under observation for months since the course was given and most of them have shown no recurrence.

The swab examinations were made by Dr. Annie Somerford and the treatments carried out by Dr. Jenny Craig, to whom I am indebted for her interest and her careful notes on the cases.

CONGENITAL PYLORIC STENOSIS IN FIRST COUSINS

BY E. A. COCKAYNE, D.M. Oxon., F.R.C.P. Lond.

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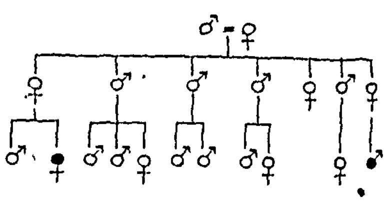
CONGENITAL pyloric stenosis has been recorded several times in more than one member of the same sibship and once in a *mother and child*. W. P. Sheldon and I have also reported a pair of uniovular twins, both of whom had this defect of development. There can be little doubt that the condition has a genetic basis, though the way in which it is inherited is still uncertain, and an environmental factor may be necessary for its production in addition to the genetic one. In the course of the last two years I have come across two instances of its occurrence in first cousins, and the diagnosis was verified in all four babies when a Rammstedt's operation was performed.

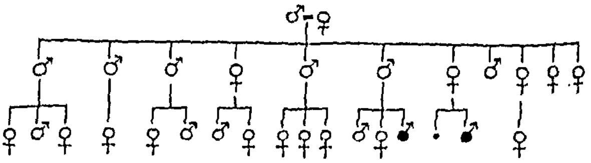
Pedigree 1.—The boy, a first child, was seen at the Hospital for Sick Children, Great Ormond-street, on Sept. 3rd, 1931, and was operated on successfully soon afterwards. His first cousin, a girl, had been operated on previously for the same condition at St. Mary's Hospital, Plaistow, and she also recovered. The mothers of the two babies were sisters: four of their brothers were married and had normal children, and one sister was married, but childless. There was no consanguinity of parents in either case and no previous history of the defect having occurred before in the family was obtained.

Pedigree 1



Pedigree 2.—The boy was seen at the Hospital for Sick Children on March 9th, 1933, at the age of 7 weeks. He was operated on and made a good recovery. He is a third child with an older brother aged 7 years and a sister aged 5. His first cousin, aged 15 months, is an only child, but his mother had a miscarriage early in her first pregnancy. He was operated on at the Royal Free Hospital in January, 1932, and the surgical registrar kindly informed me the existence of pyloric stenosis was confirmed at the operation, from which he made a perfect recovery. The parents of these first cousins were brother and sister, and there were four other brothers and two sisters, all of whose children were normal, and one brother and two sisters unmarried. There was no consanguinity of parents and no history of any other cases of pyloric stenosis in the family.

Pedigree 2



None of the parents of these four babies suffers from dyspepsia, nor are they aware that they had vomiting or other digestive disturbance in babyhood.

It is probable that the occurrence of the condition in collaterals is fairly common and a history of it might be obtained more often, if a careful inquiry was made in every case. I think the publication of these two fully authenticated pedigrees is of value, because it provides further evidence that congenital pyloric stenosis is an inherited defect.

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[1] Schauffler, G. C.: Amer. Jour. Dis. Child., 1932, xliii., 350.

DONATIONS AND BEQUESTS.—The late Miss Elizabeth Lindsay, of Dundee, whose personal estate is valued at over £17,000, among other bequests left, on the expiration of the life rent of her brother and sister, £1050 to Dundee Royal Infirmary for the endowment of a bed in memory of her father, and £100 to the Royal Victoria Hospital, Dundee. The residue of the property is to be divided equally between Dundee Royal Infirmary, for the children's ward; the Sick Children's Hospital, Glasgow; the Sick Children's Hospital, Edinburgh; the Mukden Medical Hospital, and three other institutions.—By will the late Mrs. Amelia Ann Gardiner, of Harrogate, left £500 to the Yorkshire Home for Chronic and Incurable Diseases; £500 to the Harrogate Infirmary; and £500 to the Cancer Hospital, among other bequests. A share of the residue of the property will also go to the National Institution for the Blind, the Yorkshire Home for Chronic and Incurable Diseases, and the Harrogate Infirmary.

MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

SECTION OF OBSTETRICS

AT a meeting of this section on April 20th, with Prof. W. BLAIR BELL, the president, in the chair, a paper was read by Dr. MAX CHEVAL, of Brussels, on

Ovarian and Uterine Grafts

Dr. Cheval said that he proposed to consider only ovarian autografts—i.e., cases in which portions of ovary were removed from the patient and grafted into her. In most of the diseased ovaries removed, sufficient healthy fragments could be found to be worth transplanting; these portions preserved the ovarian function for a period which Dr. Cheval had not yet been able to determine. The ovarian autograft should be used, he said, in almost all double oöphorectomies. It was particularly important to graft fragments of the superficial part of the ovary, and to avoid handling the parts in such a way as to destroy the germinal epithelium and the subjacent layer of primordial follicles. Intramuscular grafts, and even subcutaneous ovarian grafts, were successful in all cases operated upon aseptically. If the grafts were composed of sufficiently healthy tissues, the ovarian hormone proportion in the organism was maintained at a normal level. The uterine graft was very easily effected in subcutaneous cellular tissue. At first, experimentally, there was found to be an intense reabsorption of uterine products, and that was explained by the luteal change of the ovaries. At a later stage the small endometrioma adapted itself to its new position and, more than a year afterwards, displayed undoubted signs of vitality. Grafts of ovaries in hysterectomised bitches exhibited phenomena of follicular atresia, sometimes cystic. After six months fewer follicles remained, but some were clearly about to mature. Ovarian grafts performed in conjunction with uterine grafts showed a much less degree of atresia. After six months both kinds of grafts showed plain signs of activity. In hysterectomised women under 40 uterine grafting should be performed whenever possible in order to maintain stronger vitality in the ovarian grafts. Between the ages of 40 and 50 ovarian grafting alone should be performed, while after 50 grafts were useless.

The experiments which Dr. Cheval described were of three kinds: (1) uterus left in situ and intramuscular ovarian grafts made; (2) ovarian autografts after bilateral ovariectomy and total hysterectomy; (3) uterine and ovarian autografts after bilateral ovariectomy and total hysterectomy. When ovaries were grafted into muscle or into cellular tissue only the superficial part of the ovary took root, and not until three or four months after grafting did the primordial follicles commence to show activity. No attempt should be made to assess results until that period had elapsed. Dr. Cheval showed a large series of colour slides of the grafts of the three kinds at various stages. When a piece of uterus was planted under the skin the uterine glands showed a strong reaction; they secreted a great deal of mucus, dilated, and often became cystic. One of the cases described in detail was as follows. On Dec. 3rd, 1932, a hysterectomy for uterine fibromatosis had to be performed on a woman aged 26½. An ovarian graft was implanted into the rectus abdominis, in accordance with the Blair Bell technique, and a fragment of the uterus was grafted into the subcutaneous cellular tissue. When seen in February last, the patient complained of pains felt in the region of the uterine graft, at more or less regular intervals, the pains being accompanied by a livid coloration in the region of the operation wound. The graft, which had been implanted very superficially, could be easily felt as a small cylinder, 4 cm. long and 1 cm. in diameter. It was very probable, he thought, that the slight pains noted by the patient occurred at the time of the menstrual period; this was confirmed by the slight subcutaneous ecchymosis. The woman now had no menopausal disturbance, and the grafts were functioning 14 months after the operation. In a large series of cases, when ovarian grafting was done and the uterus was left in position, menstruation was re-established in over 80 per cent. of the grafted cases. Dr. Cheval was convinced that the vitality of autogenous grafts of the ovary was enhanced by the hormones produced by the uterine mucosa.

DISCUSSION

Dr. HERBERT SPENCER said that it had been his custom to leave an ovary or part of an ovary behind whenever possible when performing hysterectomy; in his experience most of those patients remained in perfect health. Out of 325 cases of total hysterectomy for myoma, he had had three in which malignant disease supervened in the part of ovary left behind, in one of the cases a sarcoma, after many years. If ovarian grafts became the vogue he feared there would be a proportion of late malignant sequelæ. With a uterine graft he thought it would be difficult to attain the degree of sterility which followed ovarian grafting. Infection was another factor which must be guarded against in grafting. He hoped that the researches being conducted into the constitution of the hormones would ultimately result in extracts potent when taken by the mouth or in the form of suppositories.

Mr. A. S. PARKES, Sc.D., said that Dr. Cheval had not only recalled the practicability of making grafts of the ovary, but had produced evidence that the presence of uterine tissue could have a material effect on the health of such ovarian grafts. As a result of animal experiments, such as those by Dr. Cheval, much was now known concerning the behaviour of isolated pieces of ovarian tissue, and though the human subject would not necessarily react in the same manner; the experiments showed anyhow what might be attempted. The presence of ovarian tissue was essential for the maintenance of the uterus, and this correlation was substantiated by the experiments. In only one case had removal of the uterus been found to have a definite effect on the ovarian cycle. Loeb found that the life of the corpus luteum after hysterectomy was prolonged to three times its normal length in the guinea-pig, but this had not been confirmed in regard to other animals. The speaker suggested that the recently discovered stimulating action of the anterior lobe of the pituitary body might be used in maintaining the health of the ovarian graft. The possibility of using an ovarian graft to alleviate menopausal symptoms, natural or artificial, was closely bound up with the problem of the cause of the menopause. The ovarian cycle was regulated from the anterior pituitary body. At the menopause did the ovary gradually cease to function because the required stimulus from the anterior pituitary body had ceased to become available, or did the ovary so change that it could not further respond to stimulus from the anterior lobe? If an ovary was removed from an immature animal and grafted into an ovariectomised animal of adult age, that immature grafted ovary would undergo development and become mature long before it would have done so in the environment of the immature animal. And if an ovary was taken from an adult animal and grafted into an immature animal, this grafted ovary regressed, and did not show further development until the host became adult. The rapid maturation of the ovary grafted into the adult animal was caused by the immediately available anterior lobe hormone. Clearly there was a very delicate mechanism of control, but it was certain that the stimulating action could be used for increasing the activity and maintaining the health of ovarian grafts. In operations near the menopause great benefit would probably result from the administration of anterior lobe of pituitary extract at the time of the operation.

Dame LOUISE MCILROY had done some grafting experiments years ago on rabbits, and later on monkeys; she now felt, however, that there was no place for autografting, though there was a place for grafting the ovary of another person. If even a fragment of ovarian tissue remained it was infinitely better to leave it in its normal position than to remove and graft it. She had had no experience of grafts of the uterus.

The PRESIDENT said that he had himself carried out ovarian grafting 218 times since 1912, but the operation had been sadly neglected by British gynæcologists. He had always maintained the importance of preserving the natural connexions of the normal ovary when possible. Only those structures should be removed which were diseased beyond hope of recovery or were a source of danger, function being conserved whenever possible. Ovaries were of metabolic and psychological value to the patient. Both clinical and experimental investigations had shown that ovarian grafting was practicable. In neoplasms it was often possible to preserve a portion of the ovary with its blood-supply, as the tendency of innocent tumours was to grow away from the hilum. Only autogenous grafts should be used; and his custom was to attach a ligature to the graft and keep it in the peritoneal cavity until actually used. He preferred to remove most of the dense capsule of the human ovary. It was not necessary to preserve the superficial follicles, as they were liable to become cystic, and experiments showed that interstitial cells alone sufficed to keep the uterus functional. The material to be used he sliced in a criss-cross fashion on a rubber pad. He usually implanted the graft in a blood-free nidus among the fibres of the right rectus abdominis. The President said that 106 of his 218 patients were between 17 and 30 years of age, and 90 between 31 and 40. In 201 the indication for the operation was salpingitis, in 16 the presence of innocent neoplasms of ovaries. There were five deaths after the operation; in 79 cases the after-histories were not obtained. Menstruation was possible in 113 cases, and it occurred in 80, or 70 per cent. of the cases analysed. In 14 menstruation was absent but the menopause was averted. In the 21 hysterectomy cases menstruation was impossible. Usually menopausal symptoms occurred for a few months after the operation, indicating complete removal of ovarian tissue from its normal site. Sometimes the onset of menstruation was not long delayed, the secretion formed in the grafted tissue being absorbed immediately; but in those cases a fragment of ovary might have been left behind. In some cases menstruation continued normally for years; one patient, now aged 40, had continued to menstruate for 15½ years. Dr. Cheval's use also of grafts of the uterine mucosa was of great interest. Alban Doran and others had stated many years ago that the gonads atrophied after pan-hysterectomy, and in 1906 the President had expressed the view that the uterus had an internal secretion, which he named "uterin"; he now felt less certain of this. As, however, menstruation itself was of importance to the patient, he considered that when performing supravaginal hysterectomy for fibromyoma in young women, some endometrium should be left. Of his 218 cases, the operation was the wedge-shaped fundal removal in 122, the low supravaginal in 27, and total hysterectomy in 18. In an analysis made of his cases up to 1925 of wedge-shaped removal, he found that 68 per cent. of the patients who had an ovarian graft had subsequently menstruated, whereas 89 per cent. of the women in whom an ovary was preserved in situ menstruated. He thought ovarian grafting in the human subject was capable of further improvement, and he suggested that prolan should also be administered to stimulate the functions of the graft. Even at the present time the percentage of successes showed the method to be scientific, practicable, and beneficial.

MEDICAL SOCIETY OF LONDON

A MEETING of this society was held on April 23rd, with Sir JOHN THOMSON-WALKER, the president, in the chair. Dr. JOHN RYLE and Mr. A. J. WALTON read the papers published elsewhere in this issue on

Failures of Gastric Surgery

Dr. EUSTACE CALLENDER *said that his experience* of gastric surgery was confined to gastro-enterostomy for the relief and cure of duodenal ulcer, and in the cases in which he had advised this operation it had been *completely and permanently successful*. It was eminently successful in suitable cases, and many failures of gastric surgery could be avoided by careful selection. Much responsibility in this respect rested with the general practitioner, who knew the patient and his family.

Sir WILLIAM WILLCOX, speaking of jejunal ulcer following operation, said he would not put the proportion as high as Dr. Ryle's 10 per cent. Recurrence at the site of anastomosis was very unsatisfactory, and much more difficult to deal with than the original ulcer. He agreed with Mr. Walton that posterior gastro-enterostomy was the safest operation for the "three-way tap cases." Mr. Walton's figures had confirmed the speaker's view that carcinoma very rarely developed in an ulcer.

Dr. G. E. VILVANDRÉ referred to cases in which the appendix was removed for symptoms actually due to duodenal ulcer. Lack of adequate investigation might thus make it necessary to undertake a second operation. Four times he had come across a well-marked gastric ulcer on the small curvature, some distance above the stoma. It was difficult to see how a gastric ulcer could follow a gastro-jejunostomy, but possibly a minute ulcer had been present at the time when the first operation was performed. *Or it might* be that the conditions causing a duodenal ulcer were still present to cause a gastric lesion.

Mr. DONALD BARLOW said he had always regarded partial gastrectomy *as far too radical a remedy* for ulcer of the stomach. The condition seemed to demand physiological rest for the organ, both as regards movement and the passage of hydrochloric acid and food over the ulcerated surface. Acidity could easily be neutralised. He suggested that one means of securing this rest would be, after emptying and cleaning the stomach, to paralyse its nerve-supply temporarily—e.g., by crushing the vagal nerves and allowing them to regenerate.

Dr. ERNEST YOUNG said the use of the duodenal tube would secure a good deal of rest for the stomach. Although bathed in a highly acid fluid, the ulcer managed to heal, and it seemed unnecessary to make the gastric contents alkaline. He agreed with Dr. Ryle that operation was contra-indicated in patients—usually young people—with duodenal ulcer and very rapid emptying of the stomach. Such cases almost always in his experience turned out to be surgical failures. He asked what procedure Mr. Walton adopted for a patient with both gastric and duodenal ulcer. He had found that such patients responded very well to duodenal feeding.

Mr. W. H. OGILVIE thought that the surgical failures in the cases under discussion constituted a more serious problem than some of the speeches might suggest. Few surgeons saw their own failures; in twelve years he had seen only two recurrent ulcers of his own, but had operated upon 30 anastomotic ulcers in patients whose primary operation was done elsewhere. Unnecessary and early operations for duodenal ulcer were responsible, he thought, for the majority of the surgical failures, and surgeons who had duodenal ulcer were generally in favour of medical treatment for themselves. Another cause of failure was the performance of operations which were unsound in theory and unsuccessful in practice; among these he included local resection of ulcers, the Billroth II. operation, and all anastomoses between afferent and efferent loops of the stomach—none of which did anything to counteract the causal acidity. He was also against posterior gastro-jejunostomy, while admitting that technically it could be regarded as an operative gem. It used to be thought that if a patient had no distress for three years after a gastro-jujunostomy he was permanently cured, but he had seen recurrence of symptoms as long as 30 years afterwards. The only way in which excessive acidity could be permanently reduced was the safe procedure of radical gastrectomy—i.e., removing at least four-fifths of the stomach. But before operating one should be certain that medical treatment had been given every possible chance.

Dr. MAURICE SHAW said that ultimately success or failure must depend on the skill with which cases were selected for operation, and which cases should have medical treatment. When surgery had been decided upon, the operation was not the *beginning* and the end of treatment. By following out a modified diet after operation he had had a large number of radiological cures, and several cases of relapse after operation had been rehealed by medical treatment. There were very few ulcers for which he would not try medical treatment before advising surgery. He asked whether Mr. Walton removed the appendix as a routine measure in gastric and duodenal cases.

Dr. J. R. WYLIE exhibited a table in which were given the results of operation in 492 gastric and duodenal cases. He had found very little evidence that carcinoma started in an ulcer. X rays gave a 75 per cent. accuracy in diagnosis.

Dr. RYLE, in reply, said that anastomotic ulcer was the commonest and most serious sequel of operation, and there were no means of ascertaining its frequency. Probably Mr. Walton's figures were true for expert surgeons, but these operations were being done all over the country, by competent and incompetent alike. He was particularly troubled by the case of high acidity and rapid emptying of the stomach.

Mr. WALTON said he did not make a practice of removing the appendix in these cases. Since 1919 his follow-up department at the hospital had been so active that he had not lost sight of a case. In reply to Dr. Young he said that when a patient had both a gastric and a duodenal ulcer, his procedure depended on the nature of the gastric lesion: if it was a small ulcer he excised it and did a gastro-enterostomy: if it was big and adherent he did a partial gastrectomy. He always gave alkalis for three weeks after operation, and prohibited all smoking.

JOURNALS

Quarterly Journal of Medicine

THE April issue (Vol. III., No. 10) contains the following papers: Increased Carbohydrate Tolerance in Diabetics Following the Hourly Administration of Glucose and Insulin over Long Periods, by Arthur Ellis (London). It was noticed while treating a large number of diabetics that severe cases, mostly young subjects, requiring large doses of insulin, showed wide fluctuations in blood-sugar, marked hyperglycæmia occurring at certain hours, with hypoglycæmia at others. This instability was thought to be due to a depletion of the hepatic glycogen reserves and an attempt was made to increase these reserves by giving hourly glucose and insulin. Surprising results were obtained: first, in the amount of glucose which severe diabetics could deal with in these circumstances; secondly, in the temporary improvement in carbohydrate tolerance which resulted.—A Contribution to the Study of Erythroblasteris: Icterus Gravis Neonatorum, by J. C. Hawksley and Reginald Lightwood (London). An investigation was made into the part played by the blood and blood-forming tissues in this disease; the blood changes were found to consist, in a rapidly developing anæmia, of an hæmolytic type with a brisk response by the hæmopoietic tissues which were intensely stimulated. Evidence is given supporting the view that some cases of idiopathic juvenile cirrhosis and splenic anæmia may have their origin in icterus gravis.—Pellagra in Britain, by Hugh S. Stannus and Charles R. Gibson. A case of pellagra is described at length with a detailed history of onset, progress, and recovery, together with subsequent observation over a period of two years. The geographical distribution is discussed and this is followed by a summary of all the published cases in this country.—Observations of the Speed of the Circulation, by C. W. Curtis Bain. The normal time taken by the blood to travel from the arm to the face is determined by the histamine flush test. The time was found to be fast in hyperthyroidism, effort syndrome, advanced anæmia, and diseases of the lung. In cardiac cases dyspnœa and effort angina appeared when the flush time had slowed to 31 seconds and venous congestion was found in about half of those cases whose flush time was 32 seconds or more. Œdema was an almost constant finding in cases whose flush time was 42 seconds or more, the above figures applying only when the lungs, blood, and basal metabolism were normal.—The Peripheral Circulation in Acute Lobar Pneumonia, by C. Bruce Perry (Bristol). A study of the behaviour of the small vessels of the skin was made in 26 patients suffering from lobar pneumonia with the object of establishing that the circulatory failure in lobar pneumonia was a failure of the circulation at the periphery rather than a failure of the myocardium on the vasomotor centre. It was found that the capillaries of the skin showed *an impaired efficiency* in their contractility at the height of the disease and that their recovery was slow and was not immediately affected by the crisis. It was concluded that part at least of the circulatory failure in lobar pneumonia was due to this inefficiency of the small blood-vessels. It was further established that the blood pressure was raised rather than lowered during the acute phase of the disease.

REVIEWS AND NOTICES OF BOOKS

Pulmonary Tuberculosis

Medical and Surgical Treatment. By H. MORRISTON DAVIES, M.D., M.Ch., F.R.C.S., Medical Superintendent, Vale of Clwyd Sanatorium, Consulting Surgeon to University College Hospital. With Chapters on Specific Treatment by L. S. T. BURRELL, M.D., F.R.C.P., Physician to the Royal Free Hospital and the Brompton Hospital for Consumption and Diseases of the Chest; and Tuberculosis in Childhood, by W. BURTON WOOD, M.A., M.D., M.R.C.P., Physician to the City of London Hospital for Diseases of the Heart and Lungs. London: Cassell and Co. 1933. Pp. 460. 27*s*.

Mr. Morriston Davies occupies a unique position in this country, not only as a pioneer worker in thoracic surgery, in which connexion his name is as well known abroad as it is at home, but as one who for many years has combined the dual rôle of physician in charge of a sanatorium and thoracic surgeon. The combination of these qualifications in one man is rare, but obviously the physician-surgeon should be peculiarly well fitted to assess the value of treatment by ordinary sanatorium methods and the benefits to be obtained by more active intervention. Mr. Davies's constant insistence that the effects of expectant treatment at a sanatorium should be studied before surgical intervention of any kind is considered will command general approval; but when such methods have failed, the patient may well be prepared to accept immediate suffering and the risks inseparable from surgery in the well-founded hope that surgical interference may lead at any rate to a temporary restoration of health and some prospect of permanent cure. Special interest thus attaches to the author's descriptions of collapse therapy in all its forms. It is an achievement to have condensed so vast a subject into so small a space; less than 250 pages contain all that the general medical reader, and indeed almost all that the chest physician need know of every accredited surgical method employed in the treatment of pulmonary tuberculosis. The reader may feel that some of the operations described, involving three or even more visits to the operating theatre, would be a severe strain even on a phlegmatic patient, and that by the highly sensitive such recurrent mutilations, undertaken as they must be without guarantee of success, would be regarded as worse than death. It is indeed almost with a feeling of relief that we learn that some concession to human frailty is allowed when the position is at last admitted to be entirely hopeless and "it is time to relax some of the rigours of treatment." Mr. Davies's care for detail and therapeutic minutiæ of treatment are very apparent in his sympathetic references to the dying and in his suggestions for the alleviation of terminal suffering.

The golden mean is not easy of attainment. There are those, and even sanatorium superintendents are of the company, who yield to the spirit of defeatism, and rather than risk the death of a patient will incur no risks in treatment. But as Mr. Davies points out, though death from misadventure may thus be avoided, death from disease becomes inevitable. There are also those who lose sight of the ends in their enthusiasm for the means of treatment, and who appear to be more interested in experimental surgery than in the ultimate fate of individual patients. In the hands of the former group valuable lives which might have been saved are sacrificed to the timidity or even to the mental inertia of their medical advisers. But precipitate intervention or surgical interference in cases beyond the reach of surgery entails unjustifiable risks in the one case, and aggravation of suffering in the other. And lives are lost which might have been saved.

Dr. L. S. T. Burrell contributes a useful section on specific therapy, and Dr. Burton Wood has written an admirable chapter which describes and illustrates the various manifestations of pulmonary tuberculosis encountered in childhood.

We warmly commend this book, not only to the attention of special workers in this field, but also to the general practitioner upon whose advice as to the best methods of treatment the ultimate fate of the patient often depends.

The Teaching of Speech

By G. SIBLEY HAYCOCK. Stoke-on-Trent: Hill and Ainsworth Ltd. 1933. Pp. 302.

THIS book, issued by the National College of Teachers of the Deaf, is made up of three parts written at different times and approaching the subject from different angles. The first section, on the methods for promoting the quality of naturalness in the speech of the deaf, is the Braidwood prize essay, awarded to the author in 1928. It is a clear description of the ways in which the teacher of the deaf may induce by cultivation a good voice, resonant, intelligible, and satisfactory as regards speech. The task of the teacher is particularly difficult when a pupil has to be taught to vary the pitch, and Mr. Haycock rightly points out that in all the methods which he suggests the teacher, besides being experienced and possessing a good ear and technical knowledge of the rules of voice production, must have imagination and ingenuity. The second section of the book is a classification of speech sounds with an explanation of their production and development. The common faults of voice production are stated as well as the methods for their correction. The directions given are precise and elaborate; even when labial and dental adaptation are required the author's instructions can be followed. The third section deals with the maintenance of intelligibility and contains practical suggestions as to how intelligibility may be promoted throughout a school career. An interesting addendum to the first section is a note on the value of suggestion in the development of pitch in the voice of congenitally deaf children. The child possesses a larynx and all the accessories for supplying motive power and for increasing the volume and resonance of the laryngeal note, but cannot produce markedly different tones. The only way out of the difficulty, says the author, is for the teacher to act on behalf of the child and devise suitable exercises for the evocation of tones. Then, and with great perseverance, he must proceed on the principle of trial and error instructing the pupil to reject the bad results and hold fast to the good.

Mr. Haycock, who is superintendent of the Langside School for the Deaf in Glasgow, has for many years been recognised as one of the foremost teachers of the deaf not only in England but in all civilised countries, and it is good that he should have placed his range of practical knowledge at the disposal of those concerned.

THE LANCET

LONDON: SATURDAY, APRIL 28, 1934

THE DIFFERENTIATION OF NOXIOUS DUSTS

THE medico-legal significance of dangerous dusts in industry is beginning to assume the international importance which it has long deserved. Following the report of a committee of experts convened last year, a meeting of representatives of governments is to be held at Geneva next month with the object of drawing up a preliminary charter to secure compensation for those who suffer damage due to silicosis, one of the most generally recognised forms of hazard. It is unlikely that asbestosis, another scourge whose evils have been demonstrated more recently, will as yet be granted international status. The sequence leading up to such recognition usually begins with private action—i.e., admission by a firm or group of firms conducting an industry that the workers in it are liable to a risk. This admission is sometimes made spontaneously and sometimes under pressure of local public opinion, and is generally associated with research into the methods whereby the risk can be reduced or avoided. There follow regulations for the protection of persons employed in the hazardous occupation and a scheme of compensation for those affected in proportion to the damage they have suffered. The next stage is the coördination of such schemes in any one country by laws designed to bring the practice of all employers up to the standard set by the best, coupled, as in South Africa and in this country under the Medical Research Council, with active encouragement by subsidy of research into the cause and possibilities of prevention and cure of the pathological condition engendered by the dust. Only when national conscience in several countries has reached a certain degree of sensitivity can international action be hoped for. This stage has now been reached in regard to silicosis, but it is clear that other allied conditions will demand recognition in the future.

In the past the only way of establishing the dangers of inhaling any particular dust was the melancholy one of observing the toll of morbidity and fatality among the workers exposed to it. No criteria could be established in advance of this experience, since the fibrotic process is as a rule slow to develop. The obvious method of study—the exposure of animals to the dust under the same conditions as the workers in mines and factories, or the mimicry or exaggeration of such conditions in specially constructed dusting chambers—has been used by Dr. L. U. GARDNER and his staff at Saranac Laboratory for many years with success, and it is evident from his report for 1933, which has just reached us, that development of this work on a vast scale is contemplated. This technique, however, has the primary disadvantage that the length of time during which exposure is necessary is so long as to be measured in years rather than in months. There is need for more rapid methods of distinguishing potentially dangerous from inert dusts in order that the risk may be recognised before serious damage has been done, and adequate means devised and adopted for the protection of workers exposed to the dust. Incidentally it is highly desirable to investigate biologically the theory recently put forward by Mr. W. R. JONES, D.Sc.,[1] that the presence or absence of sericite—a silicate of potassium and aluminium—in a dust is the factor determining its pathogenicity. His view is based on his detection, by petrography and by chemical analysis, of the presence of sericite in lungs of patients dying from silicosis and his failure to detect this substance in lungs of men dying from fibroid tuberculosis of the lung who have not worked in a dusty atmosphere. His conclusions are supported by the fact that in certain mines in Australia, and in the Kolar gold mines in India, where silicosis is unknown, no sericite is present, whereas in the Rand mines of South Africa it is present in large proportion. If Dr. JONES proves to be right it will be necessary to establish the proportion of sericite that makes a dust dangerous. Thus for many reasons a more humane method of diagnosing dangerous dusts than by watching the fate of employees, and a more rapid and certain method than by the use of a dusting chamber for animals has long been desired.

In a series of communications bearing on this problem published during the last two years Prof. E. H. KETTLE has described experimental methods which in his hands have proved more convenient than dusting chambers for the differential diagnosis of biologically harmful from biologically inert dusts. Of these, the first to be tried was the subcutaneous injection of a suspension of the dust to be tested into the flank of a mouse, which subsequently receives an emulsion of tubercle bacilli into the tail vein. Dusts which are known to be active cause local necrosis and a pronounced cellular reaction in which the tubercle bacilli accumulate and multiply; while the inert dusts bring about little or no tissue reaction and do not favour the growth of the bacilli. A drawback of the method is the production of lesions in the subcutaneous rather than in the pulmonary tissues where the damage occurs in industry, and in recognition of this the next step[2] was an attempt to expedite the formation of pulmonary lesions by intratracheal injection of suspensions of dust. The onset of fibrosis was disappointingly slow, so slow indeed as to raise a doubt whether in the absence of an infective factor it is possible to produce silicosis. When, however, a suspension of even an avirulent strain of tubercle bacilli was introduced with the dust, the reaction to the infection tended to be so pronounced as to mask the early fibrotic changes due to the dust. An emulsion of killed tubercle bacilli was then substituted[3] for one of live bacilli, with the gratifying result that using the active dusts the fibrotic process was accelerated, while the inert dusts remained quiescent in the lung substance or were gradually phagocytosed. A further development of this technique is recorded in our present issue, which promises to provide a neat short cut to the classification of dusts. Where a noxious dust reaches the lung through inhalation or through intratracheal injection, the first lesion to be observed is in the glands at its base. As early as three months after intratracheal injection of a suspension of crystalline silica, or of finely ground flint, changes can be observed in the pulmonary glands, long before true silicotic lesions in the lungs are visible; but that these ultimately develop was shown by the examination of other animals in the same series which were allowed to survive for much longer periods. Control experiments with iron-coated silica and wellingtonite, both being inert dusts, showed merely a copious deposition of dust without any cellular activity or fibrosis. Since these observations were only incidental to the main object of the experiments, which was the study of the later pulmonary lesions, the earliest date in which the changes can be found was not ascertained. But it is clear that in the short space of three months or less it should be possible to estimate whether any given dust is likely to be among the active or inert dusts, though it is not claimed that a dust can be finally incriminated on indirect observations. Application of the method on a large scale might well result not only in a definite preliminary classification of dusts, but in the establishment of standards by which any samples could be tested.

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[1] Jour. Hyg., 1933, xxxiii., 307.
[2] THE LANCET, 1932, i., 1199.
[3] Jour. Path. and Bact., 1934, xxx., 201.

AN AMERICAN HEALTH INSURANCE SCHEME

ONE effect of the profound economic depression in which the American people have been engulfed during the last three years has been to direct the attention both of the lay public and the medical profession to the subject of health insurance, which has hitherto been regarded as unsuited to American conditions and to the national character. The diminution of income from which all classes have suffered has been felt with special severity by those who earn their living by the provision of medical care. In 1930 the average income of doctors fell to 10 per cent. below the level of 1929, the last of the boom years, when in spite of the boom one-third of all doctors had net incomes of less than £500 and one-half less than £760, and the subsequent decline has been much more marked. In some parts of America, and particularly in the West, the troubles of the profession have been intensified by the growth of systems of contract practice carried on as commercial undertakings, in which the services of the doctors are exploited to their detriment for the profit of the lay promoters. These systems had their counterpart 40 years ago in this country, and they exhibit all the evils then described by a special commissioner of THE LANCET (the late Mr. ADOLPHE SMITH) in a remarkable series of articles, afterwards republished in "The Battle of the Clubs," which embodied the results of the first systematic study made of contract medical practice in Great Britain.

Health insurance, then, has already made its appearance in America and seems likely to extend; and many doctors are seriously concerned that its extension should proceed on lines that will lead to results satisfactory both to the profession and to the public. The subject was discussed at the annual convention of the Western Hospital Association at Sacramento on April 9th–13th, which opened with an address on Health Insurance for the American People by Mr. JOHN A. KINGSBURY, secretary of the Milbank Memorial Fund. Mr. KINGSBURY outlined a scheme of compulsory health insurance, organised on a state-wide basis, which would apply to all families with annual incomes of less than £600 or £1000, and be open to voluntary contributors without income limit. The scheme would provide a complete range of medical services including hospital treatment, periodical medical examinations, dentistry, home nursing, prenatal care, laboratory services and immunisations, but no provision would be made for cash benefits to compensate for loss of wages. Mr. KINGSBURY is satisfied that it is possible to frame a scheme of compulsory health insurance which would be within the means of the public and yet pay the practitioner adequate remuneration. The scheme proposes to pay the general medical practitioners an annual sum equivalent to 30*s.* per insured person, the method of remuneration being settled by the organised group of practitioners in each area. It is estimated that the medical services would cost about £5 4*s.* per person annually, of which 20 per cent. would be borne by the State and the remaining 80 per cent. by insurance contributions graduated according to ability to pay. The scheme contemplates that while financial and administrative matters would be dealt with by an executive body the professional services would be under professional supervision, with a joint committee of lay and professional members to deal with complaints and disputes.

The administration of the scheme would be guided by what Mr. KINGSBURY regards as five practical lessons which emerge from the study of European and American experience. These are, in his own words:

> "1. Freedom of all competent practitioners who subscribe to the necessary rules of procedure to engage in insurance practice.
>
> 2. Freedom of all persons to choose their physician or dentist from among all practitioners in the community who engage in insurance practice.
>
> 3. Freedom of insurance practitioners to accept or reject patients.
>
> 4. Minimum interference of the insurance system with the private practice of medicine for those who prefer and can afford the private purchase of medical service.
>
> 5. Professional control of professional personnel and procedures."

It will be interesting to note the reaction of American doctors to Mr. KINGSBURY's proposals. Their official journal has recently remarked[1] that "American physicians have become accustomed to seeing the effects of compulsory health insurance depicted in a roseate hue," and has quoted at length a passage from our own columns [2] describing the hardship arising from the 10 per cent. cut on the 9s. capitation fee—a hardship now fortunately in process of mitigation.

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[1] Jour. Amer. Med. Assoc., April 7th, p. 1158.

THE CURRICULUM

At its Dublin meeting the representative body of the British Medical Association received and discussed a report from a special committee on medical education. The report was an interim one; the meeting was not asked formally to approve it but rather to indicate whether there was any fundamental objection to the main suggestions contained in it. That report was gratefully received by the meeting, and during the winter the same committee has continued its deliberations and has now presented [3] a report to the council of the B.M.A. which is to be submitted to the Bournemouth meeting in July for its approval, with the intention then of sending copies to the General Medical Council and other bodies interested in medical education. The interim report has been embodied in the report now presented. No alteration has been made in its main points; it has been rounded off and amplified.

Sir HENRY BRACKENBURY summarised the report at the Dublin meeting. The committee, he said, had defined medical study as properly beginning at the point at which a student starts work upon human anatomy and physiology, and they had had to decide what stage he should have reached before he began those studies. All agreed that the course should not be lengthened, but it was generally felt that the education of the student should have reached a certain standard before he entered on the study of anatomy and physiology, and the first main change proposed by the committee was that the student should give evidences of a heightened educational standard and of being well grounded in the fundamental principles of chemistry, physics, and biology in their application to medicine. Conflicting views have been expressed as to the nature of the instruction in the basic sciences necessary for medical education. There are those who emphasise the acquirement in physics, chemistry, and biology of a certain knowledge of facts which are of direct value to the medical student and practitioner, but the view has prevailed in the committee that the essential purpose of these studies is the training of the student in scientific method and discipline rather than the acquirement of a smattering of technical knowledge. If, as is suggested, two years or thereabouts are given to the study of these sciences along with other subjects of general education—usually English language and literature, a foreign language, and perhaps history—an intellectual equipment and scientific outlook will have been acquired which will enable the student readily to apply these sciences to his own particular field.

After registration, which the committee would wish to see made a statutory obligation, it is felt that too great demands are made on the student's time in the courses of anatomy and physiology as at present taught. These should be taught as interrelated subjects, their main aim being the study of the living rather than the dead body, and it will be generally admitted that it cannot be necessary for the student to dissect every part of the dead body. At this period it is suggested that the student should become familiar with the methods of manual examination and be taught the use of the clinical thermometer and the various "scopes" along with the estimation of blood pressure, the examination of blood, and the analysis of secretions; but not more than five terms should be occupied with this part of the curriculum, and in its present report the committee shows how desirable it is for the inclusion of three special subjects, attention to which has been woefully inadequate. These are genetics, growth, and mental function—and although from the systematic side they could probably be dealt with in a few lectures the committee evidently doubts whether these should be given by the appointed teachers of anatomy and physiology. The most interesting suggestion for the clinical years is that a period of two years and six months on the lines of the present curriculum, but with less specialisation, should close with the final written and oral examination, but that the student should not be eligible to obtain his legal qualification without a further period of nine months of practical experience to be gained in one of five ways: (1) in a resident appointment in a teaching hospital; (2) as clinical assistant in a hospital or clinic; (3) as pupil assistant to an approved general practitioner; (4) as pupil to an approved M.O.H.; (5) in regular attendance at hospital practice in a medical school. It was at this point that the committee was not unanimous, for one of its members felt that it was a bad thing for students to spend their last year hanging about the hospital out-patient department. The report as it stands is a very interesting and stimulating contribution to the revision of the medical curriculum which does at long last seem likely to be taken seriously.

THE council of the British Medical Association has recommended that Sir Richard Stawell, consulting physician to the Melbourne Hospital and Children's Hospital, should be elected president of the Association for 1935–36. The annual meeting is to be held at Melbourne next year in the week beginning Sept. 9th, and at Oxford in 1936. The report of the council issued last week states that the Sir Charles Hastings clinical prize for 1934 has been awarded to Dr. Helen Lukis, of New Malden, for her study of the problems of anæsthesia in general practice. The Katherine Bishop Harman prize given every second year for the encouragement of study and research in avoiding the risks of childbearing has been awarded to Dr. J. M. Munro Kerr, regius professor of midwifery in the University of Glasgow. A certificate of honourable mention was given to Dr. Dora Colebrook.

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[2] THE LANCET, March 17th, p. 600.

[3] Brit. Med. Jour., April 21st Suppl., p. 192.

ANNOTATIONS

VITAMIN-A DEFICIENCY

LACK of vitamin A produces its worst effects in infancy, when it may cause blindness from keratomalacia. A lesser deficiency is associated with xerosis of the conjunctiva with night-blindness; and when it is yet milder there may be night-blindness with no other ocular symptom. The proposal is now made that moderate degrees of vitamin-A deficiency should be ascertained by testing the light sense, and working in the pædiatric and orthopædic divisions of the Children's Hospital in Iowa City, Dr. P. C. Jeans and Dr. Z. Zentmire [1] have examined this in 213 children who were considered to be in normal health. For the purposes of the test a Birch-Hirschfeld photometer was used and it was found that 168 of the children had normal recovery of light adaptation after 10 minutes in the dark. The other 45, however, had an abnormally slow recovery, and to discover whether this depended on a deficiency of vitamin A 21 of them were retained in hospital. Here it was found that after periods varying from 4 days to 6 weeks (average about 12 days) on a diet ncluding three teaspoonfuls of cod-liver oil daily they all showed normal response to the dark-vision test. These figures suggest that about one-fifth of all the children tested had some degree of vitamin-A deficiency, and though they were to some extent a selected group, being physically afflicted members of poor families, Jeans and Zentmire have clearly made out their case that moderate degrees of night-blindness in children are not uncommon, may pass unrecognised, and can readily be detected and cured.

The whole subject of vitamin-A deficiency in children is reviewed in a very helpful way by Dr. Helen Mackay in the April number of the *Archives of Disease in Childhood*. After quoting G. A. Dawson's observation that in 1928–29 there were about 100 cases of night-blindness and xerophthalmia attending nursery and elementary schools in Darlington, she goes on to mention observations of her own which suggest that slight grades of deficiency are also common in nfants. These observations (to be fully described n the next issue of the same journal) concern the relation of such deficiency to the minor infections of the skin so often seen in children of the hospital classes. Though in Mackay's opinion there is no satisfactory evidence that lack of vitamin A is responsible for any of the usual respiratory or intestinal infections of children in this country, she has come to regard susceptibility to skin infections as "probably the first sign of vitamin-A deficiency in infants." It is possible, she adds, that the relatively high incidence of such infections in the lower social strata is more a matter of diet than of soap and water.

INFECTION AND DENSITY OF POPULATION

General R. Erhardt, of the Swedish Army Medical Service, has recently [2] drawn attention to the effects of density of population on the incidence of certain diseases such as angina faucium and streptococcal infections in general. In 1910, 75·2 per cent. of the Swedish population lived in rural areas. By 1930 this ratio had fallen to 67·5 per cent. It is probable that this tendency of the Swedes to collect in the towns is reflected in the frequency with which angina faucium occurs in the Swedish army. Between 1921 and 1930 approximately 17 per cent. of all the illnesses in the Swedish army belonged to this category. Incidentally the same disease takes first place among Finnish recruits, and it has been calculated that more than 50 per cent. of all the deaths in the Finnish army are due to streptococcal infections. Dr. Erhardt draws special attention to recent changes in the concentration of his fellow-countrymen in hospitals and allied institutions. While the total population of Sweden rose from 5·3 millions in 1907 to 6 millions in 1927, the number of general hospital beds rose in the same period from 8580 to 18,085, the number of sanatorium beds from 892 to 6309, the number of fever hospital beds from 3593 to 6962, and the number of mental hospital beds from 6898 to 12,118. This enormous rise in the number of institutional beds has been accompanied by an even more striking rise in the number of persons employed by hospitals and allied institutions. Taking a certain typical military hospital, Dr. Erhardt shows how, between 1910 and 1930, the number of persons employed on the hospital staff has risen from 30 for every 100 beds to 53. Dr. Erhardt discusses at considerable length and with the aid of charts the structural modifications he would like to see introduced by hospital architects with a view to minimising as much as possible a concentration of human beings which promotes infection.

A FÜLLEBORN MEMORIAL NUMBER

THE Tropical Institute at Hamburg is the abiding memorial of Friedrich Fülleborn but, as we have already indicated,[1] his pioneer work was in helminthology, and it is proper for a special parasitology number of the *Chinese Medical Journal* (November–December, 1933) to be dedicated to him. Among its many papers the filarial group of worms is well represented. L. C. Feng describes a new investigation into the differences between *Microfilaria bancrofti* and Brug's *Mf. malayi*, the material coming from Huchow, in the Chekiang Province; he speaks highly of methyl-green pyronin as a simple, lasting stain with good differential characters. It merits comment that though this embryo has been known for seven years no serious effort has been reported to find the adult worms by excision of glands during life, a method which has given such happy results in F. W. O'Connor's hands, and seems capable of modification to admit of the escape of the worms themselves for ready examination. S. M. K. Hu has shown, in collaboration, how ready an intermediate host is *Culex pipiens pallens* for *Wuchereria bancrofti*; and H. F. Hsu and J. Y. C. Watt that guinea-worm is indigenous in dogs in Peiping, and that four species of cyclops there are effective intermediate hosts, so that the causes of the happy escape of man merit investigation. R. Hoeppli is entertaining in a paper dealing with many curiosities in human parasitology. There was, for instance, an old belief in Europe that parasites were present as eggs when Adam and Eve were in Paradise, but that development was stayed till the eating of the forbidden fruit; there was a notion 150 years ago that tapeworms are disturbed by music; and there was the almost equally old comment that pains must be taken to discover the kind of instrument which they most dislike so that it might be used as a vermifuge. Among many facts which cannot at present be explained is placed microfilarial periodicity, it being noted that O'Connor's laborious and areful work speaks for Clayton Lane's theory that t is due to simultaneous cyclical parturition of the emale worms; but more work on this matter is eeded. There are several papers dealing with issue changes caused by parasites, for instance, umour growth and those caused by kala-azar and *Clonorchis sinensis,* the last furnishing yet another nstance where the extent of microscopical damage utstrips the appearance of clinical symptoms.

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[1] Jour. Amer. Med. Assoc., March 24th, 1934, p. 92.
[2] Nordisk Medicinsk Tidskrift, Feb. 10th.

[1] THE LANCET, 1933, ii., 712

Finally, Hoeppli furnishes a sympathetic appreciation of Fülleborn. An army medical officer (he was wounded on the Western Front during the Great War), he was naturalist, helminthologist, and brilliant lecturer, had curious and complete incapacity to draw and a literary style which was complicated; he was a great conversationalist, fine cook, and persistent smoker—a many-sided and very human personality.

DAWSON WILLIAMS MEMORIAL PRIZE

THE Dawson Williams Memorial Fund was established by voluntary subscription in 1928 in commemoration of the late Editor of the *British Medical Journal.* Its object is the award of a prize every two years, or at longer intervals, in recognition of work done in connexion with pædiatrics. The fund is administered by the following trustees: the Presidents (for the time being) of the Royal College of Physicians of London, the Royal College of Surgeons of England, the British Medical Association, the Royal Society of Medicine, and the Section for Disease in Children of the Royal Society of Medicine, and the Editor of the *British Medical Journal.* There have been two previous awards of the prize—namely, in 1930 to Dr. F. J. Poynton, for his work on behalf of rheumatic children, particularly with regard to the establishment of special "rheumatic centres"; and in 1932 to the late Sir Robert Jones for his work in connexion with the pædiatric side of orthopædics. The trustees have decided to make the third award this year to Dr. G. F. Still in recognition of his work for sick children, and with the consent of the council of the British Medical Association the prize (a certificate and cheque for 50 guineas) will be presented by the President of the Association on the occasion of his presidential address at Bournemouth on Tuesday, July 24th, 1934.

VOMICÆ TREATED CONSERVATIVELY

BEFORE the Medical Society of Davos Dr. F. Bauer has related his experience[1] of the spontaneous disappearance of tuberculous cavities in the lung. Speaking after long residence in Alpine sanatoriums Dr. Bauer has retained his belief in the ability of the hygienic-dietetic régime to deal with the severe destructive forms of tuberculosis of the lung, and he besought his colleagues not to forget the wonderful successes attained before the introduction of collapse therapy—results still within the clinician's reach. For himself he could not overlook the troublesome complications resulting from artificial pneumothorax; patients who had recovered after collapse therapy did not, he thought, regain respiratory function as completely as those who had not undergone any surgical procedure. Dr. Bauer is a warm supporter of the standpoint of Dr. Fernand Cardis of Leysin, who demands a period of strict conservative treatment lasting two or three months before beginning pneumothorax treatment. Even with afebrile patients he thought this period was best spent in absolute rest in bed. It should be long enough to show whether there was a good tendency towards fibrosis. In any case it gave time for a diminution of toxic absorption and for improvement in the condition of the remaining foci in the same or in the other lung. He thought the danger of hæmoptysis during this period had been very much exaggerated; he had very rarely seen it occur. The likelihood of the pleura becoming prematurely adherent—the other objection raised—was very slight in patients kept strictly quiet in bed. Recently he had occasion to inquire again into the subsequent history of the 29 patients with lung cavities, treated conservatively in the Park (late Turban) Sanatorium, reported on by H. Wohlers[2] four years ago; 21 of these patients now, after an average period of six years, had remained well, 18 of them following their normal occupation.

OPTICAL CRAFTSMEN

THE last day of the recent London meeting of the Ophthalmological Society of the United Kingdom was taken up by a tour of inspection of optical workshops. The Association of Dispensing Opticians had extended an invitation to the society to inspect two of the larger factories owned by its associates. These two firms were obligingly at work over the Saturday afternoon in order that the congress members might see in progress the various processes in the manufacture of spectacle lenses, safety glass, frames, and ophthalmic instruments. In these days of mass production the visitors must have been refreshed by the extent to which this work remains a craft. It is true, of course, that the ophthalmologist's prescription is translated by the technical and mathematical lore of a generation into precise instructions to a machine, but even so the man or woman in charge of the machine has enough scope to take pleasure in the work. The materials themselves are attractive, consisting primarily of optical glass, emery, and rouge; the addition of pitch with which the lens is fixed firmly into its bed before grinding begins affords additional pleasure owing to its plasticity to the younger members of the staff who use it. It must often have occurred to the unlearned to wonder how an optical prescription which may contain both cylinder and prism, as well as two spherical surfaces, can be readily and precisely translated on to a spectacle glass. It is interesting to know that where bifocal glass is ordered the work always begins with differentiating between these two spherical surfaces, the deeper of which is first ground and then filled in with some protective material while the flatter surface is ground. When this has been completed the lens is taken out of its bed and turned over to take the rest of its grinding on the other surface. Checking of the curvatures requires instruments of extreme precision, and these are for the most part designed and made in the same workshops. The transparency of the working material has this advantage, that instruction about the axes of the cylinder can be affixed with white cement to the surface of the glass which is not being worked at the time, and the white letters stand out vividly against the background of pitch. There must be little or no occupational risk, as the grinding is all done on a wet surface; in the only department in which the lenses are clipped to shape the workpeople wear protective masks. The material for frames also affords much scope for craftsmanship, especially in working the shell of the turtle, which still remains the most popular frame in use in spite of the growing variety of more plastic and less expensive materials. The only regret in the ophthalmologist's mind must be that the refractive error and the eye for which it is prescribed are not susceptible to as accurate an analysis as the spectacle glasses; in fact, compared with the product of the modern optical workshop the eye itself is becoming a little démodé.

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[1] Acta Davosiana, April, 1934.

[2] Ann. de Méd., 1930, xxviii., 397.

INTRACRANIAL TUMOURS

A RECENT analysis by Dr. Leonard B. Cox[1] of a series of 135 cases of intracranial tumour collected in Melbourne, shows that the same types occur in much the same numerical proportions as obtain both in this country and in the United States. An exception, however, is found in granulomatous tumours, which are much rarer in Victoria. Cox's series does not include any of these tumours; they form 2·2 per cent. of Cushing's much larger series and were undoubtedly far more frequent, in this country, at any rate, during last century. The difference is attributed to the greatly lowered incidence of tuberculous infection in Australia and to the more efficient prophylactic and hygienic conditions of the present day. Most of Cox's specimens were obtained at necropsy. This, no doubt, accounts for the fact that metastatic and invasive tumours form 14·1 per cent. of the total, whereas they formed only 4·2 per cent. in Cushing's collection, which is essentially that of a practising surgeon. There can be little doubt, from consideration of statistics published elsewhere, that the former figure gives a more accurate estimate of the incidence of secondary intracranial growths.

The gliomas are analysed at considerable length. Those who are interested in the cytological problems of this group will find a more detailed account in a previous article by the same author.[2] While adopting the classification of Bailey and Cushing and appreciating its value as a means of dividing the gliomas into groups having a definite clinical and histological picture, Cox is critical of its theoretical implications. He concludes that "a classification based on the similarity of the neoplastic cells to those observed in histogenesis does not present an exact picture of these tumours." Most histologists will agree with him. In practice a certain number of specimens present insuperable difficulties to classification. Amongst the different types of glioma that known as glioblastoma (or spongioblastoma) multiforme was most frequently encountered in the Melbourne series. This tumour arises as a rule in the deeper parts of the cerebral hemispheres and displays a highly malignant character. Cox, therefore, takes the reasonable view that the surgical removal of such tumours is in general impracticable. He lays himself open to challenge, however, in suggesting that such attempts are never feasible. It occasionally happens that a tumour of this type is small, superficial, and reasonably circumscribed. Such examples have been successfully removed, but it is not yet known with what ultimate results. The medulloblastomas, which occur principally in the cerebellum in young children, are also highly malignant and hence unfavourable from the surgical standpoint; they are, however, susceptible to X ray treatment. In the Melbourne series a few examples were found in adults, and evidence was obtained that in some of these the rate of growth is much slower than is the common expectation. The meningeal tumours, or meningiomas, lend themselves readily to surgical removal provided that vigorous measures are taken to prevent the exsanguination of the patient. Cox finds that recurrence of the tumour often takes place even when its removal was thought to be complete. This, again, is a point on which individual experience is likely to vary. These tumours are almost always histologically benign, and the factors that are responsible for recurrence are as yet little known.

Diagnosis of a metastatic tumour is generally a signal for inactivity as far as surgical intervention is concerned; some surgeons hold, however, that if the cerebral metastasis is solitary and accessible it may be worth while attempting its removal. Amongst other guiding principles on treatment Cox suggests that "in practice it is wise to do a decompression operation over the site where a tumour is considered to be growing, even if a pessimistic view be taken of its nature. . . . . By an examination of the exposed brain there is less chance of being confronted at autopsy by a favourable tumour where an unfavourable one was diagnosed. In each of two cases in this series, an operation for carcinoma had been performed prior to the onset of cerebral symptoms. It was expected that the cerebral tumours would be metastases, but in each case a glioma was found at autopsy." Even if the tumour should not be wholly removeable there are substantial chances both of relief to the patient and prolongation of his life.

THE PERILS OF THE MILK-SUPPLY

A DEPUTATION from the People's League of Health was received by Sir Hilton Young, the Minister of Health, and Mr. H. E. Dale, representing the Ministry of Agriculture, on Wednesday last, April 18th, the object of the deputation being to urge upon the Government the need for efficient protection of children from milk-borne diseases, and especially from the danger of contamination with tubercle. The deputation had its origin in the scheme of the Government for the provision of milk for children in State schools, and the speakers presented the difficulties under which medical practitioners laboured in advising the use of cow's milk with a knowledge that it was improperly controlled. The deputation having been introduced by Dr. C. O. Hawthorne, chairman of the Council of the League, Lord Moynihan emphasised the fact that the existing supply of milk, defined by him as "almost a perfect food" was not safe, and gave it as his opinion that, while the eradication of tubercle from cattle would lead to a safe supply, it was impossible to wait for such a reform; for the present all milk other than "Certified" and "Grade A" (tuberculin tested) milk should, he said, be pasteurised. Many representative speakers followed, pointing out the wide existence of milk-borne infection, emphasis being laid in more than one quarter on the fact that if pasteurisation is adopted the procedure should be carefully controlled. Practical evidence of its utility, however, was afforded by Sir Pendrill Varrier-Jones, Sir John Robertson, and others. The unhygienic methods of milk distribution in London and elsewhere came in for notice, and finally Miss Olga Nethersole, the founder of the League, read communications from unexceptionable authorities, all stressing the dangers of milk-borne disease. Sir Hilton Young pointed out to the deputation that they were preaching to the converted, while he dwelt on the importance of educating the public in regard to milk-supply. Here he recognised the influentially supported work of the League to be of the greatest value. He agreed that all possible steps to remove infection from herds must be taken, but allowed that for the present reliance must be placed upon further measures for the protection of the milk-supply. And he reminded the deputation that the Government were prepared to spend £750,000, spread over the next four years, in support of a campaign for securing a purer milk-supply.

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[1] Med. Jour. of Australia, Feb. 10th, 1934, p. 182.

[2] Amer. Jour. of Path., 1933, ix., 839.

SANITY IN A MENTAL WARD

THE Sheffield coroner recently held an inquest on a woman of 60 who died from uræmia in the mental ward of a public hospital. She had been transferred there because her doctor had given a certificate stating that she was of "unsound mind." He had been treating her for bronchitis, she had become delirious, and he had overlooked the renal condition. The coroner commented on the difficulties in lunacy law administration and seemed to imply that as the patient had uræmia as well as bronchitis her delirious condition might have been treated differently and not in a mental ward. With such a contention very few of those responsible for general medical wards would agree. Ideally it would be possible to have two wards in a general hospital in each large centre reserved for delirious and confused patients whose mental symptoms followed upon physical disease. The benefit of this in puerperal cases is obvious, and the arrangement might do more than satisfy the Sheffield coroner. It might, for instance, lead to general physicians and psychiatrists working in closer association; some general trained nurses would acquire greater acquaintance with some forms of mental disorder; and the medical students would have occasional opportunities of seeing acute psychoses without being wholly dependent upon journeys to distant hospitals. Such schemes could not be carried out simply. They entail easily recognised difficulties, but so far as the student is concerned the divorce of ordinary clinical experience from his acquaintance with acute psychotic and psycho-neurotic disorders leaves him unprepared for the exigencies of practice when at any time he may need to deal with them.

Other reflections are provoked by the coroner's remarks. Have we really reached a point at which we do not label as insanity any disorder to which physical causes contribute? Fortunately the idea long prevalent that the insanities stood apart from general medicine is displaced in the medical mind by the recognition that all the available information about the physical condition of the patient is germane to the question why his behaviour is what it is. The immediate denial of physical causation in a psychotic patient examined only once is no longer possible. Such a cause is recognised in the syphilitic psychoses and some other obscure agent *may* be present in other mental patients. If the coroner's remarks have stimulated both psychiatrists and general practitioners to hunt for physical determinants of abnormal behaviour they will do nothing but good. From the layman's point of view two aspects of the interrelation between the physical and mental can be observed. These are a tendency to ascribe all mental disorders to a physical cause, an opinion which will enable him to avoid any inquiry as to how far environment or earlier maladjustments have contributed to a psychosis. The other—almost an opposite—tendency is to regard the senile psychoses as comparable to the biogenetic disorders. Both opinions tend to confuse those who are seeking to assess the degree of hereditary taint. The first predisposes to an optimism which subsequent events too often nullify. The second tends to divert inquiry from the arterial changes accompanying senile psychosis when further investigation might reveal symptoms due to the removal of inhibitions and the previous behaviour pattern of the patient.

One final question. Are we to rest satisfied with the fact that a uræmic patient became delirious? Or must we not go on to inquire whether the delirium is a matter of blood-chemistry or of psychic structure or both? We do not know why one cardiac patient becomes psychotic whilst another with a severe degree of decompensation remains mentally stable. These and many questions like them await a serious answer. Mental heredity only satisfies a certain number of such cases. If the Sheffield incident arouses that closer association between general physician and psychiatrist which is a corollary of the coroner's remarks, further knowledge of prognosis and psychopathology should be forthcoming.

GENITO-URINARY SURGERY IN AMERICA

THE printed transactions of the American Association of Genito-Urinary Surgeons record the trend of thought in this important specialty. In Vol. XXVI. which has just reached us H. A. Fowler and J. A. C. Colston record their views on primary carcinoma of the ureter and primary tumours of the ureter respectively. The rarity of this condition is shown by the fact that the records of the Bradey Urological Institute comprising over 22,000 urological cases contain only three instances of primary tumours of the ureter. A survey of the literature on the subject shows that the vast majority of these are of epithelial origin and of the papillary type. Squamous-celled epitheliomata are rarer and are usually found in association with chronic irritation from stones or infection. The most valuable diagnostic sign is obstruction to the passage of a ureteric catheter followed by copious hæmorrhage, and the appropriate treatment nephro-ureterectomy.—J. F. McCarthy and J. S. Ritter write on bacteriophage therapy in genito-urinary infections. Their greatest successes were in 16 cases of staphylococcal septicæmia, of which six recovered. The writers consider that bacteriophage therapy is a valuable prophylactic measure in the prevention of kidney infections secondary to carbuncle or furunculosis, as well as a means of treatment of established infections of the urinary tract. They have devised special instrumental methods for direct intraprostatic administration as well as for injection into the seminal vesicles.—J. R. Caulk in discussing prostatic resection claims that the electro-cautery is a safer method of removing tissue than the high-frequency current. He bases this opinion on the fact that high-frequency current applied for more than a second may do considerable damage to the surrounding tissues to a depth it may be of over a centimetre. A point of practical importance that may be deduced from this is that it is advisable in carrying out prostatic resection to shift the scene of activity from one portion of the gland to another, in order to avoid accumulative heating of any one segment. Caulk urges that the smallest effective current should be applied for the shortest possible time and that if bleeding occurs it should be controlled with coagulation currents which are far less penetrating and damaging. In his opinion some of the cases of incontinence that have followed resection may be due to the devitalising action of heat on the sphincter.—Writing on the subject of bony metastases secondary to carcinoma of the bladder, R. C. Graves and R. E. Militzer state that these are more common than is usually supposed; apart from the pelvis, there would seem to be no particular predilection for any bone. Bony metastases from carcinoma of the bladder are usually of the osteoclastic type although some cases show osteoplastic changes.—G. C. Prather and E. C. Crabtree contribute an interesting article on the lone kidney in pregnancy, based on a total of 296 nephrectomised women and 365 pregnancies. Although the surviving kidney showed the dilatation changes in the pelvis and upper ureter that are so familiar in pregnancy, renal function tests proved the existence of an adequate margin of safety. Accumulated statistics give a mortality-rate of only 1·09 to 1·4 per cent., proving that as a general principle nephrectomy is not a contra-indication to pregnancy.

POST-OPERATIVE INFECTION OF THE PAROTID GLAND

MASSABUAU, Guibal, and Bert in a recent communication [1] distinguish two types of parotiditis occurring as a sequela to operation. In one, suppuration of the parotid is an incident in the course of a general pyæmia, and carries a very grave prognosis. Parotiditis developing during convalescence from a straightforward surgical procedure (such, for example, as appendicectomy and sub-total hysterectomy in the two cases quoted) usually runs a more favourable course, although subject to the danger of certain rather common complications. Of these the three most important are facial paralysis, temporomandibular arthritis, and perforation of the wall of the external auditory meatus. Facial paralysis is not usually due to direct injury either by the incision of the gland or by spreading gangrene in its substance, but, according to Massabuau, is caused by compression, or by œdema of the nerve sheath. It is a lesion from which a full recovery is to be expected, even though it may be a tardy one. The paralysis lasts, on an average, from three to six months. Temporomandibular arthritis may be further complicated by the supervention of subluxation of the joint. In a patient observed by Massabuau, in whom such a subluxation was associated with facial paralysis, there was what he calls "une physionomie très particulaire." Perforation of the anterior wall of the meatus seems to be a comparatively common complication. Raby, quoted by Massabuau, gives the incidence as 34 out of 100 cases. The pus appears to take the line of least resistance to the postero-inferior part of the gland and then to track through at the attachment of the cartilage to the bone. This perforation of the meatus becomes apparent about the tenth day of the parotiditis and does not seem to be of very serious import; it may occur despite early incision. Massabuau discusses the various theories of the ætiology of post-operative infection of the parotid. He holds that Stenson's duct is definitely inculpated as the portal of entry. Inflammation starts in the centre of the gland and is multipolar in spread, the peripheral parts being only secondarily infected. The flora of the infected gland is that of the mouth. Finally, experimental infection of the duct has been much more successful in producing parotiditis than has experimental infection of the artery of supply. Granted that the infection spreads from the mouth the incidence of the disease must be traced either to buccal infection (gingivitis, dental caries, stomatitis), to lowered general or local resistance, or to alteration in the excretory function of the gland. There would appear to be reasons to suspect several of these factors operating in any one case. Suppression of salivary secretion may be of importance, sometimes in relation to the absence of the normal stimulus when the patient is given fluids by routes other than the mouth. Various factors associated with operation, such as purgation, vomiting, hæmorrhage, and excessive secretion during ether inhalation, may deplete the patient of fluid and be followed by a diminished salivary secretion. The possibility of reflex inhibition has also been mooted. Passive congestion, as by lying constantly on one side of the face, or injury to the parotid by forceful traction on the mandible during anæsthesia have also been blamed. Treatment consists essentially in early superficial incision of the infected gland with opening of the deep part with forceps. Pus is not always found, but discharge is likely to appear in abundance within the following two days. Other forms of treatment proposed, as injections of pilocarpine, compression of the gland and bacteriophages, are generally regarded as of subsidiary importance.

THE PREVENTIVE ASPECTS OF MEDICINE

THE course of lectures on the preventive aspects of medicine which was held on Thursday afternoons during the winter session at King's College Hospital, and was open to medical men as well as to students, is to be resumed on May 3rd, when Col. L. W. Harrison will lecture on the Prevention of Venereal Diseases. Four subsequent lectures will be delivered to complete the series, on May 10th, 17th, 24th, and 31st, as follows: Prevention of Accidents, by Prof. Millais Culpin; Prevention of Mental Diseases, by Dr. Edward Mapother; Principles of Immunisation as applied to Preventive Medicine, by Prof. W. W. C. Topley, F.R.S.; and Public Agencies which exist for the Prevention of Disease, by Dr. Allen Daley. These concluding lectures, like their predecessors in the series, will be published in THE LANCET.

ON Tuesday, May 1st, and Thursday, May 3rd, at 5 p.m., Dr. C. H. Andrewes will deliver the Oliver-Sharpey lectures of the Royal College of Physicians of London. His subject is viruses in relation to the ætiology of tumours. Prof. O. L. V. de Wesselow's Croonian lectures, on arterial hypertension, are to be given on June 5th, 7th, and 12th.

POST-GRADUATE HOSPITAL COURSES IN SWITZERLAND.—The International Hospital Association is arranging a post-graduate course in Switzerland from Aug. 15th to 23rd, to be followed by a study trip through the canton of Grisons. The course is divided into three sections for which separate tickets will be issued. Section A opens with study committees at Basle on Aug. 15th, followed by hospital visits in Basle and Zurich on the 16th and 17th, and in Lucerne on the 18th. Section B opens at Berne on Aug. 19th with an official lunch followed by visits to local hospitals on the 20th and 21st, and a visit to Leysin where Prof. H. Rollier will receive on the 22nd and 23rd. Lectures will be given by well-known representatives of official bodies and hospitals, and a small scientific and industrial exhibition will be provided at Berne. Section C is a study trip on Aug. 23rd, passing through Brigue and Coire to Arosa where Dr. Gähwyler will lecture and Dr. Fonio demonstrate plans for a cantonal hospital; on the 26th Dr. Nienhaus will lecture at Davos; on the 27th Dr. Enderlin will talk at Schuls; and on the 28th the baths at St. Moritz will be visited under the conduct of Dr. Bernhard. Railway concessions have been obtained, and the cost of the course will not be greater than those of previous congresses at Vienna, Knocke, or Frankfort-on-Maine. The chairman of the International Hospital Association is Dr. G. von Deschwanden (Lucerne). Inquiries should be addressed to the Veska-Bureau, Obergrundstrasse 13, Lucerne, Switzerland.

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[1] Arch. de la soc. des sci. méd. et biol. de Montpellier, February, 1934, p. 91.

PROGNOSIS

A Series of Signed Articles contributed by invitation

IV.—THE PROGNOSIS IN ENLARGEMENT OF THE PROSTATE

The Basis of Prognosis at the Initial Consultation

USUALLY it is an increased frequency of micturition which leads a man whose prostate is causing obstruction to seek advice from his doctor. Sometimes it is the dreadful pain of acute retention, at others the inconvenience of incontinence. Whilst the last condition demands without delay a surgical operation with its attendant risks, this is not necessarily true of the former. To take first the common case of bladder irritability, the gravity of outlook will vary within very wide limits. The practitioner must make the supremely important decision whether his patient's life will be curtailed by delay or whether, on the other hand, it may be possible to arrange that he may continue to pursue his usual avocations in safety, physical comfort, and mental repose. The primary consideration is the condition of the kidneys, and here may be emphasised the very great assistance to be obtained from the simple measurement of the residual urine. Should this be less than three ounces it is unlikely that renal impairment has occurred. But this opinion should be checked by information given by the amount of urea in the circulating blood and the urea-concentration test. If these are within normal limits the patient may be reassured. He need not face an operation. By careful living, by the avoidance of acts which cause congestion of the prostate he may live for some years with little or no discomfort and perhaps the necessity for operative treatment may never arise. On the other hand if the urine is infected, operation should be urged as the risk of extension to the kidneys is greater than the risk of surgical treatment.

To estimate the probable progress of the disease by the feel of the prostate per rectum is almost impossible. The hardness of the malignant prostate will reveal the inevitable steady increase in size, but many patients live for three or four years after a malignant prostate has first been diagnosed. With the soft adenomatous prostate, size is no criterion of the degree of obstruction. Indeed the central intravesical enlargement which early produces serious hindrance to urinary outlet is imperceptible by rectal palpation. In such cases of bladder irritability with impalpable enlargement, a cystoscopy must be performed to estimate the amount of obstruction or even the cause of it before any prognostic pronouncement can be made. The intravesical nodule causes so much obstruction that operation must usually be advised. Certain patients whose kidneys are unaffected, and whose residual urine may be no more than an ounce in quantity, suffer in health from the broken sleep due to great frequency. Operation with its attendant risks must be recommended in these conditions.

The man whose first symptoms are due to acute retention must be just as carefully examined when his acute condition has been relieved by catheterisation, before treatment can be planned or prognosis estimated. Curiously enough such patients sometimes come well out of such clinical scrutiny and with care may, without any discomfort whatever, continue their ordinary lives for a year or more before further symptoms arise. An attack of acute retention does not necessarily condemn a man to an operation. The outlook is dependent, as in the irritable bladder type, upon the damage which has or has not been done to the kidneys.

When the patient who presents himself is dribbling urine, with the bladder distended to overflow, serious renal deficiency is always present. These are the worst cases from that point of view, but on the other hand, power of recovery of kidney function is astonishingly great and in such cases the urine is seldom infected, so that the outlook is not too grave.

The Outlook following Surgical Operation

The immediate concern of a man about to subject himself to surgery as a relief for prostatic symptoms is his prospect of surviving the operation. Although within recent years careful preparation and selection has very much lowered the risk of prostatectomy, it must still be regarded as a hazardous procedure. The patients are generally old, frequently decrepit, their kidneys are damaged, their heart musculature enfeebled, they are often anæmic and have lost much of their powers of reaction towards infection. Taking into account all these unfavourable features it is truly remarkable that as low a mortality as 3·4 per cent. has been recorded in a large series of cases. The general mortality amongst expert operators is probably considerably higher than this, from 4 to 8 per cent. The mortality risk depends largely upon the condition of the patient when he seeks surgical aid. If there has been long-standing back pressure and infection has supervened the risk of death must be much greater, 10 to 20 per cent., whereas early in the disease it is certainly less than the average. Since the poorer members of society are apt to neglect the earlier signs of disease, hospital statistics are usually less favourable than those of series of private patients, though the conditions under which the former are operated upon are as good.

If it is decided that a two-stage operation is necessary because the blood-urea cannot be brought down to a reasonable figure by catheter drainage or because of serious sepsis, the practitioner must take a graver view of the case and not lose sight of the fact that the simple cystotomy of the first stage is attended with a distinct mortality. Yet even desperate cases, patients with a blood-urea of over 200 mg. per 100 c.cm., may be so restored to health by the preliminary cystostomy as to be able to negotiate the subsequent prostatectomy successfully, which may not be possible for many months: and it is probably true to say that the risk of the second stage is less than that of prostatectomy in one stage.

The principal causes of death after prostatectomy are uræmia, sepsis, hæmorrhage, and lung complications. Urinary retention can be remedied by adequate preliminary drainage, but some of the ill-effects of chronic uræmia are not so easily overcome. Patients who have had an original high blood-urea percentage seem more prone to infective complications, the two most serious of which are pneumonia and pyelonephritis. No amount of care in irrigation of the prostatic cavity left after prostatectomy would seem to protect them from some amount of infection in this situation, and it is apt to spread upwards to the kidneys. Serious hæmorrhage may occur even after simple cystostomy from rupture of a dilated vein in the mucosa of the bladder overlying the gland. Hæmorrhage is a menace at the actual nucleation itself for two reasons: it is not under complete control and the patients, owing to the renal changes, frequently have a lowered hæmoglobin content. An operation done on a patient with only 60 per cent. hæmoglobin is associated with a very serious risk. Hence the importance from the prognostic standpoint of making this estimation. If serious sepsis of the prostatic cavity occurs there is the subsequent risk of secondary hæmorrhage. Myocarditis increases this danger. Thickened vessels with low blood pressure and feeble heart sounds are of serious import.

The remote concern of the patient is with his ultimate condition of health. What prospect has he of his condition being one of betterment for all the risk he will have to undergo? In the first place he may be confidently told that his tenure of life, if he survive the operation, will certainly be longer than if he refuses surgical aid. And, secondly, he may be assured that in general health and well-being he will stand a very great chance of approach to the normal. That this claim can be substantiated is shown by all statistical investigations, the most recent of which (F. S. Crockett and W. W. Washburn) may be quoted.[1]

> One hundred patients were questioned. Ninety-three per cent. answered that their general health was better. As far as the difficulty in beginning micturition went, 91 per cent. complained of none; 9 per cent. had some, and a stone was found in some of these. Seventy-two per cent. had no dribbling; 19 per cent. a little after voiding; and 6 per cent. dribbling at all times. Frequency at night was not abolished in so great a proportion of cases. Only 36 per cent. had no nocturia, but 19 per cent. got up only once or sometimes not at all; 15 per cent. got up twice or less. When asked if the operation was worth going through for the benefits obtained, 95 per cent. said they were satisfied, and actually 99 per cent. said the effort was worth while.

It will thus be seen that many of these patients are restored to complete health. However, in a number it is difficult to get the urine free of infection and this may never be accomplished. Nocturnal frequency may well be due to this cause.

Stricture after prostatectomy is now very rare. A few cases of persistent urinary fistula occur. It is sometimes difficult to assign a cause for this. Sometimes it seems due to sepsis in the space of Retzius or even of the pubes; occasionally it has been cured by the removal of a diverticulum or calculus. The chance of a fistula is lessened if the bladder be opened as near its apex as possible. It is a rare complication.

A very troublesome and painful incident is the onset of *epididymitis*. This may follow the passage of an instrument, but occurs quite independently of such manœuvres, sometimes when the patient returns home. It may be quite serious, leading to gangrene of the scrotum and even death from sepsis. It seems to be preventable by ligation of both vasa deferentia.

Some of the poorer results of prostatectomy when frequency continues, sepsis remains, and difficulty of micturition recurs are due to the enlargement being malignant in nature. Not uncommonly a prostate is found to be carcinomatous only when a microscopic examination is made. If malignant disease is suspected and the surgeon believes that nucleation is possible, it should be proceeded with. Growth of a carcinoma of the prostate is often very slow. Three, four, or more years' survival with great amelioration of symptoms at least during the early part of this period is not unusual.

PERURETHRAL OPERATIONS

The place which perurethral operations should take, and the prognosis associated with them, is a little difficult to assess. Brilliant results in adenomatous enlargement as well as with fibrous obstruction have been reported in America and some very good results by surgeons in this country. Nevertheless, it must be confessed that the enthusiasm with which this procedure was welcomed by English surgeons at its introduction has waned. Difficulties from secondary hæmorrhages and in the control of sepsis are not easy to surmount, so that it is probable that the risk of the urethral operation for simple adenomata is not materially less than that of the open method. There is a tendency to restrict its use to cases of bladder neck obstruction and the malignant prostate.

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[1] Jour. Urol., 1931, xxvi., 643.

SPECIAL ARTICLES

MEDICINE AND THE LAW

The Bath Murder Case

THE conviction of Hinks in the Bath murder case, upheld on appeal, was largely due to medical evidence, and the main ground of appeal was that the judge at trial gave too little attention to the scientific witnesses called by the defence. Pullen, 81 years old, was found dead last December in the kitchen of his house. Hinks, his son-in-law living with him, said he heard a noise, went into the kitchen and found Pullen lying on his left side with his head and part of his shoulders in the gas-oven; two overcoats, he said, were draped over the front of the gas-stove and the trays had been removed from the inside of the oven. Hinks said he pulled the old man out by the feet and found Pullen had an apron held to his mouth. He turned off the gas and telephoned for the police and the ambulance men, volunteering to them the statement "you might find a bruise on the back of the head if you look where his head struck the floor." Dr. Scott Reid, the deceased's medical attendant, was reluctant to believe the story. "I know old Pullen," he said to Hinks, "and I don't think he could have done this in the way you describe." The aperture of the stove was 1 ft. 1½ in. across; the coats had not been drawn inwards by the insertion of the head and shoulders. Was it suicide or murder? The defence contended that Pullen was physically a fine old man, a good eater and well nourished, able to dress himself except for putting on his collar and tie. He had nearly been gassed, it was stated, in 1926, and he used to speak of it as a pleasant experience; "when I go, I shall go like that." The prosecution, on the other hand, said he was "tottery," constantly falling down and unable to pick himself up, incapable of the mental or physical effort to coördinate the elaborate actions of this supposed suicide, especially in the time at his disposal that night. He suffered, it was argued, from progressive senile degeneration and there had been a great change in his condition in 1933 between May, when he made a will, and September when, on a question of his executing a codicil, it was decided that he was quite unfit to understand the testamentary act. Before July a male nurse and a female nurse were employed to look after him; in July they were dismissed and Hinks gave up his work to take charge of the old man.

The Court of Criminal Appeal found the verdict was not against the weight of evidence and that the alleged misdirections of the jury were unimportant. If the judge at trial had not dealt fully with the medical evidence for the defence, it must be borne in mind that this, the latest evidence to be given, would have been freshest in the jury's mind. There was adequate evidence of motive. The family solicitor had found that Hinks, who had then been married for a few months to Pullen's daughter, was selling some of Pullen's property at Dorking against his own advice. The solicitor had refused to negotiate a settlement of part of the old man's estate on Hinks and had taken steps to protect the property by securing the appointment of a committee in lunacy.

Plainly the most significant medical evidence was that of the medical attendant who knew better than anyone else the old man's physical capacity. Much time was devoted at the trial to the bruise on the back of the head. The prosecution said that chemical tests indicated that the blood in the bruise showed no trace of carbon-monoxide poisoning; therefore the bruise, a severe one, was inflicted before death. They offered no theory as to the weapon used, if any, but they said the bruise disproved Hinks's story, since it could not have been caused by the head dropping 6 or 7 inches on to the linoleum floor after the gas-poisoning. The defence contested the conclusions and the value of the tests made several days after death. This was the part of the medical evidence which, on appeal, was said not to have been appreciated by the judge at trial and not to have been adequately stressed by him to the jury. The main issue, however, was whether Pullen was capable of squeezing his head and shoulders into the gas-oven after the preparations described. The jury evidently thought he was not. A curious feature of the case was that, on the night before death, Hinks had said he found Pullen in his bath with his head under water and his face black. Medical help being summoned, the doctor did not quite accept the story as consistent with Pullen's condition. The defence said the incident showed that Hinks had no design of murdering his father-in-law. Perhaps an alternative theory would have been that Hinks was already busy with the illusion of suicide.

It is interesting to note that Pullen's death was fully examined by the Bath coroner, the inquest not being interrupted (under Section 20 of the 1926 Act) by the initiation of criminal proceedings in another court. This fact, suggesting that the police authorities did not at first regard the case as strong enough to take up, shows that the coroner's inquest has by no means spent its force as an instrument for the investigation of crime and the detection of the criminal. Since the case has ceased to be sub judice a Bath newspaper has published details of Hinks's previous career which, had they been known to the jury at trial, would certainly have been fatal to his prospects of acquittal. On the other hand the *Law Journal* has twice referred to the verdict and the result of the appeal with a certain misgiving. While agreeing that the judges had strong grounds for not interfering with the verdict of the jury, it observes that the verdict of a jury is not infallible. Too much attention, it considers, was paid to the probable cause of death, and too little to the improbable circumstances which may have been the real cause.

Marriage Annulled for Insanity

Although the subsequent insanity of husband or wife is not yet a ground for divorce, the law will annul a marriage if either of the parties was insane at the time of the ceremony. This is because marriage is a contract and, as the court observed long ago in the Earl of Portsmouth's case, "the very essence of that most important engagement is consent; without soundness of mind there can be no legal consent." Last week Mr. Justice Bateson annulled a marriage on the petition of the husband, who alleged his own insanity at the time of the supposed contract. He had, it was proved, been mentally unfit for several months before October, 1932, when he went from Manchester to Nottingham and met a woman whom he had known for some time. They agreed to marry and were married next day by special licence. The pair went back to Manchester and lived together for a few days; a fortnight after the wedding the husband was admitted to a mental hospital. On eventual discharge from the hospital he remained under treatment and was now sufficiently recovered to be able to understand his petition though not yet fit to give evidence. The judge had to apply a test formulated in 1825 in Durham *v.* Durham: "was there a capacity to understand the nature of the contract and the duties and responsibilities which it creates?" Mr. Justice Bateson said the doctors had satisfied him that the petitioner might very well be, and in their opinion was, incapable of understanding what he was doing when he went through the ceremony of marriage; he was insane at the time and in the circumstances the marriage was a nullity and must be so pronounced.

The petition last week was more successful than that of the Earl of Durham in the case already cited. The Earl called three doctors to describe the mental state of Lady Durham, who after marriage became manifestly insane. The judge, Sir James Hannen, took into account her present condition, and asked himself if it was recent and sudden or whether it had been of slow growth and had already existed at the date of the marriage so as to invalidate the contract. He came to the conclusion that Lady Durham's mental illness did not exist until a visit she paid to Cannes after her marriage. The Earl's petition was therefore dismissed with costs. In the Portsmouth case the marriage was pronounced void because, though the husband was weak-minded rather than insane, there was an element of something like fraud in the conduct of other parties. The Earl of Portsmouth was brought up to London in 1814 by his medical attendant and was delivered over to his trustees, one of whom was Harrison, the family solicitor. A week later the Earl was married to one of Harrison's daughters; it was a clandestine wedding between a man of weak and deranged mind and the daughter of his trustee and solicitor. No such suspicious circumstances were present in the case decided last week, where the medical evidence was found sufficient to make the contract void *ab initio*.

IRELAND

(FROM OUR OWN CORRESPONDENT)

THE CUTS IN MEDICAL SALARIES

THE Temporary Economies Bill, affecting the salaries of the officers of local authorities, underwent a radical change last week in the Senate. Sir Edward Coey Bigger, formerly medical member of the Local

Government Board, introduced an amendment which provided for the exclusion from the scope of the Bill of all medical officers. Several senators supported him, and no one spoke against the amendment except the Minister in charge of the Bill, who gave as his principal ground of opposition that he did not like putting any one class of officers in a privileged position. He did not suggest that the present salaries were too high, and he agreed with other speakers that the dispensary medical officers had rendered, and were rendering, good service to the public. Although an identical amendment had been rejected in the Dáil the Senate adopted the amendment by 22 votes to 12. The only other amendment made by the Senate was a simple consequential one. The Bill as amended will now be returned to the Dáil which can agree or disagree with the Senate. Its action will depend largely on the attitude which the Minister may adopt. Hitherto he has not appeared to be over-enthusiastic for this particular clause of the Bill, and it is hoped that he may consent to the Senate's amendments, and leave the interests of medical officers uninjured.

THE IRISH MEDICAL ASSOCIATION

The annual meeting of the Irish Medical Association will this year again be held in Dublin, probably in the last week of June. In future years it will be held alternately in Dublin and the provinces. It is intended this year to widen the scope of the annual meeting by including a scientific session as well as a business section. Arrangements are being made to hold two scientific discussions on matters of interest to general practitioners as well as to physicians and surgeons. The association is reviving an old custom—unobserved since before the war—of holding a dinner on the evening of the annual meeting. It is understood that the present president and vice-president, Dr. Robert J. Rowlette and Mr. Charles J. MacAuley respectively, have consented to accept nomination by the council for another year of office.

MEDICAL ORGANISATION IN THE IRISH FREE STATE

At many times in history the question has been mooted of a unification of medical organisations in Ireland by the amalgamation or coördination of the Irish Medical Association with the British Medical Association. It has often been pointed out that two organisations acting independently, even if usually harmoniously, were less effective than a single organisation. Until a few years ago it appeared as if no form of coördination were possible except the absorption of one association by the other, a proposal which, if made, would have roused bitter opposition. A few years ago, however, to avert analogous cases to that of Ireland in Australasia, in South Africa, and in Canada, the British Medical Association altered its constitution so as to permit of autonomy in the Dominions concerned while retaining a close association with the British Medical Association. It is believed that a somewhat similar arrangement might be feasible in regard to the Irish Free State, and it is understood that conversations have been begun between representatives of the two associations, but it is still too soon to form an opinion as to their outcome.

Last week in Dublin a conference was held between delegates from the poor-law medical officers in several countries to discuss the question of medical organisation. A suggestion had been made that the dispensary medical officers should form an independent association, and the conference was originally planned to forward such a project. Before the conference was summoned, however, it was clear that opinion in the service was against an independent association. The conference was well attended, and it discussed several matters of importance to the poor-law medical service. It unanimously passed a resolution strongly in favour of the union of the British Medical Association and the Irish Medical Association. A resolution was also passed requesting the General Council of Medical Associations to appoint a committee consisting of six poor-law medical officers to study the position of the poor-law service and formulate a programme of reforms.

UNITED STATES OF AMERICA

(FROM AN OCCASIONAL CORRESPONDENT)

STERILISATION OF THE UNFIT

In its annual report for the year ending Feb. 13th, 1934, the Human Betterment Foundation of Pasadena, California, reviews the progress of sterilisation in the State of California since its first study of the subject in 1926. The State Eugenic Sterilization Law was passed 25 years ago. Up till the end of 1933 no less than 9782 persons have been sterilised, of whom 578 were operated upon in the last calendar year. These figures do not include sterilisation by private physicians of individuals at their own request, the number of these being unknown. Experience has shown that sterilisation is regarded as a protection and not as punishment, that it carries no stigma and does not affect the sex life in any way except to prevent reproduction. Dealing with the objection sometimes raised that the effect of a vasectomy, in sterilisation of the male, is permanent and may be regretted in cases of mistaken diagnosis or if the patient should change his mind, it is reported that a careful survey has shown that with proper technique operative restoration of fertility is not only possible but has been accomplished. Medical officers, probation and parole officers, and social workers all appear to be well satisfied with the operation of the law. It is stated that the policy of sterilising the unfit has been followed by a marked decrease in the number of sex offences. This is no doubt due to the possibility afforded to many to live a normal sex life to whom marriage would necessarily have been forbidden if they had not been sterilised.

AN INSTITUTE OF HUMAN RELATIONS

Mr. Paul Popenoe, who is secretary of the Foundation, also devotes a large share of his time to the direction of the Institute of Human Relations which is housed in three rooms of an office building in down-town Los Angeles (331–3, Consolidated Building). The institute provides advice to all-comers on every conceivable aspect of marriage, and in four years has been consulted by 10,000 applicants. Some of these come of their own initiative, or as a result of reading one of the institute's educational posters; a few are referred by doctors or clergy, while many are sent by the nine social agencies of the city including the Children's Protective Association, the Children's Home Society, and the Court of Domestic Relations. Analysis of the requirements of the first 10,000 clients has given the following table:—

Family maladjustment	1177	Education ..	.. 3517
Premarital consultations	1048	Child welfare	.. 753
Heredity ..	.. 184	Legal ..	.. 51
Sex problems	.. 2914	Miscellaneous	.. 356

The institute has a large volunteer corps of consultants in medicine, psychology, domestic science, Government Board. provided for the Bill of all medical of him, and no one except the Minister as his principal gr not like putting any position. He did salaries were too h speakers that the rendered, and were public. Although a rejected in the Dáil ment by 22 votes to made by the Senate The Bill as amende Dáil which can agre Its action will depen the Minister may appeared to be over- clause of the Bill, and to the Senate's amen of medical officers uni

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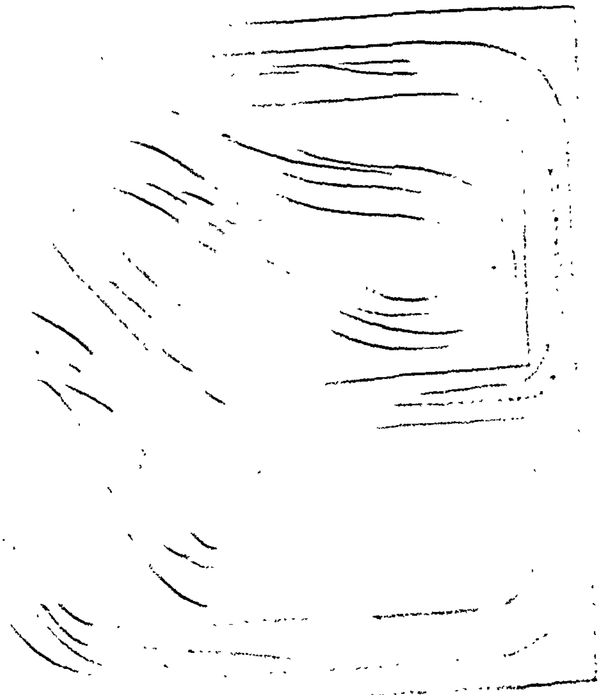

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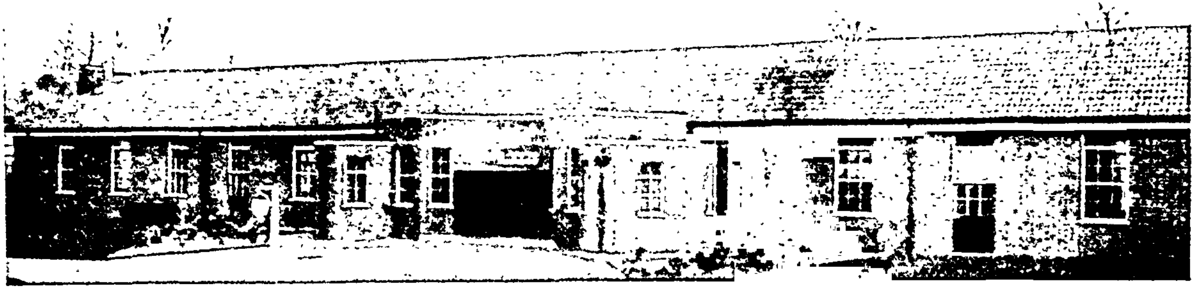

FIG. 1.—An "acute" ward block.

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ADMINISTRATIVE BUILDING

The administrative block proper, the staff homes, and the kitchen department are grouped into one building. The building may thus be considered in three portions.

The front one-storey portion comprises the administrative section and contains: main entrance hall, doctor's office, matron's office, waiting rooms, suite for an assistant resident medical officer, matron's suite, small service pantry for these two suites, deputy matron's quarters, laboratory, dispensary and drug store, sanitary arrangements for visitors and staff.

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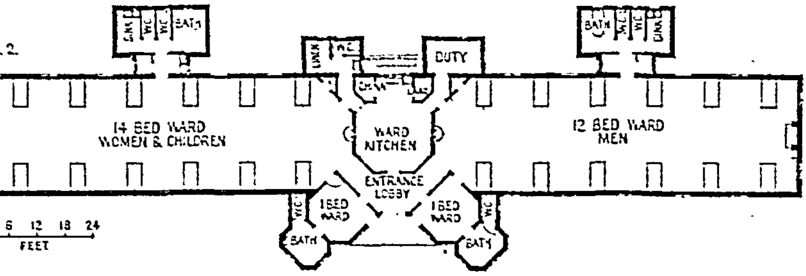

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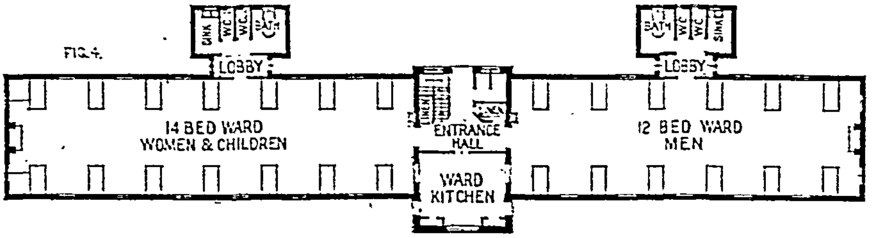
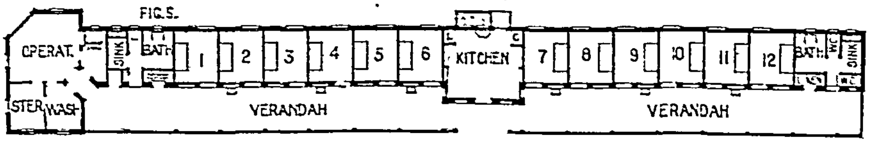


FIG. 5.



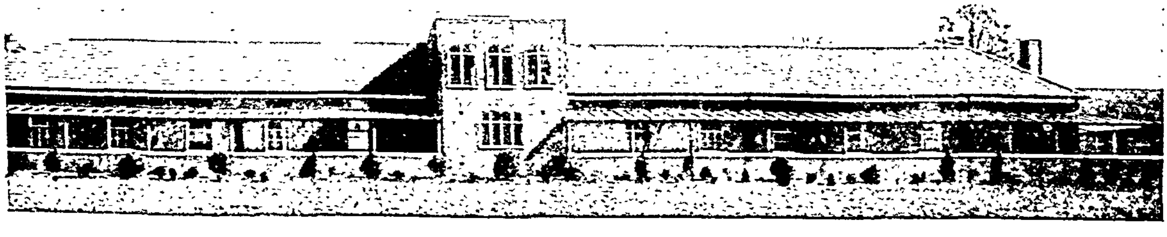


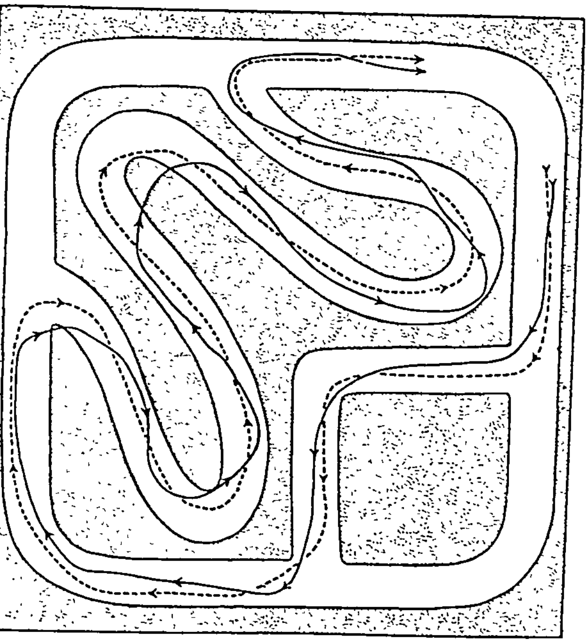
FIG. 3.—One of the "convalescent" ward blocks.

of moving towards the stationary one along a track graduated in linear measure. A button held in the hand has to be pressed to stop the approximation of one post to another, when the distance between them is deemed equivalent to the width of the screen. Several tests are made at each width of screen and the average is taken.

Judgment of speeds.—Two red objects on tracks are set at different speeds so that one overtakes or passes the other at a point hidden from the observer's view by a wooden screen suitably graduated in numbers. His task is to estimate behind what number the passing or meeting will take place. He is allowed 12 estimates in each case.

PERFORMANCE TESTS

The driving test proper, which consists of the manipulation of the controls and steering wheel of a stationary car, while a projector moving over a



IG. 2.—The dotted line represents a typical route over the track made by a good driver; the black line is the route of a bad driver. Even the good driver has cut one of the corners.

odel landscape throws a moving picture on the reen, giving an illusion of actual driving.

The car is fitted with unusual controls, so that all those sted would be equally unfamiliar with their manipula- on. There is no clutch or gear lever; the left foot is ed for foot brake and the right for the accelerator. The ack projected on the screen can be varied by the observer will, from a fairly straightforward run to the set of uous curves depicted on Fig. 2, and these can taken in either direction. The road to be travelled s a patch of grass on either side so that one who cuts e corners too sharply is liable to find himself off the road, thout "crashing" into the trees or hedges. The eering wheel has an unusually narrow lock—i.e., a very all movement produces a considerable deflection in ection.

Watched from behind the screen, the miniature track ojected is seen to be made of "grass" of green celluloid, d trees and bushes constructed cleverly of wisps of ing and horsehair. The driver is allowed ample time say 10 minutes—to accustom himself to the strange ntrols before the record of his progress is started. This sists of a tracing of his course in the form of a dotted e which records his pace as well as his direction, since pen produces ten dots every second. Variations in rate of progress therefore show in the relative distance the dots apart—for example, on the straight or round ners on the moving track.

The *confidence, road behaviour,* and *manipulative* power of a driver are estimated from a study of his record on the track.

No credit is given for excessive caution—i.e., reluctance to drive at reasonable speed on a straight road. In fact, the difference between the rate of progress on the straight and when cornering is one of the points noted, the driver who has confidence in his own abilities to slow down in good time when necessary being assessed higher than one who evidently lacks it. Much importance is attached to proper cornering, though even really good drivers are usually found to have cut one or two of the many difficult corners on the track. For the benefit of those who may feel inclined to submit themselves to these tests it may be added that only straightforward driving is required of candidates. No other vehicles are on the road, and no unexpected emergencies, other than corners, need be anticipated. The sudden appearance on the track of a cyclist or car was at one time part of the test, but it has been discontinued since the personal element on the part of the observer who timed its incidence could not be excluded. Since the test is first and foremost a comparative one, any variation of this sort would tend to invalidate the results.

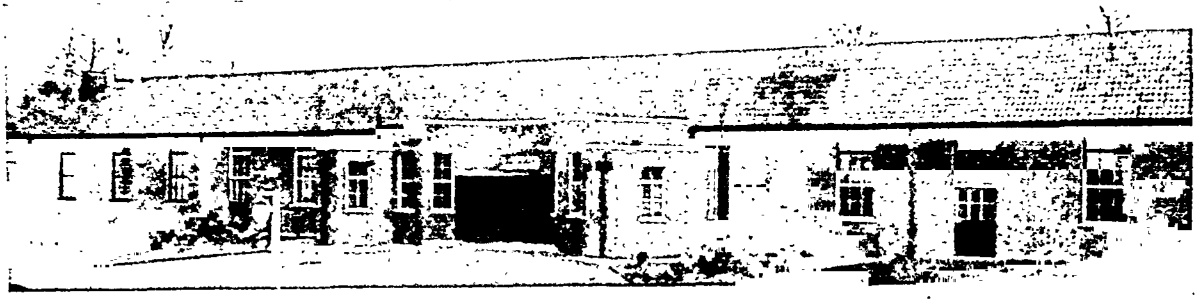
THE TESTS AS A WHOLE

A very large number of statistics would be required to prove definitely that the record of accidents incurred by drivers successful in these tests is significantly less than that of those whose response was relatively unsatisfactory. But such evidence as has been accumulated at the Institute points to this conclusion. The psycho-physical tests appear to us to be peculiarly well fitted to their purpose, especially the first three tests described above. Our representative, a doctor with driving experience extending over 25 years, was unable to complete the road tests, being one of the very few—less than 2 per cent.—who find that nausea is induced by the attempt to follow a track under the conditions offered. The factor responsible for this rare disability has not yet been ascertained. Without going so far as to suggest that all tests of behaviour on the actual highway, though their value is admittedly limited, should be superseded by those described above, we warmly endorse the plea made by Sir Ernest Graham-Little in the *Times* of April 23rd for the enlistment of the help of the industrial psychologist in planning tests suitable for mass application.

THE NEW ISOLATION HOSPITAL AT COVENTRY

THE opening on Monday last at Coventry of a new hospital of 148 beds for the isolation of infectious disease is an event of interest to those engaged in hospital administration. We are indebted to the medical officer of health, Dr. Arthur Massey, for the following account.

The site on which the hospital stands is 1¾ miles from the centre of the city; it comprises 16 acres, while 10 further acres of adjoining land have been reserved for future extension. The situation is open and the gentle slope gives a southerly exposure. The subsoil is of marl, clay, and sand. The buildings have been erected to the plans which won for their author, Mr. Stanley Atkinson (of Messrs. Wimperis, Simpson, and Guthrie, architects, London),



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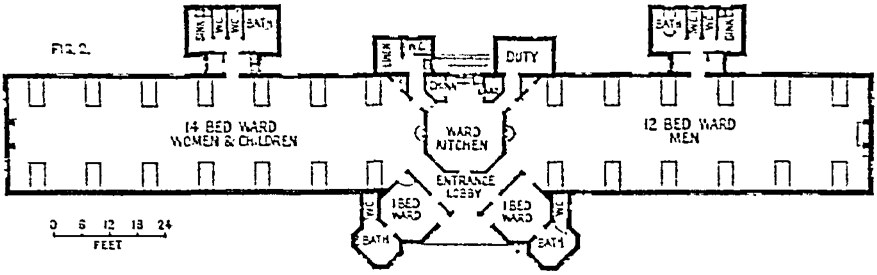

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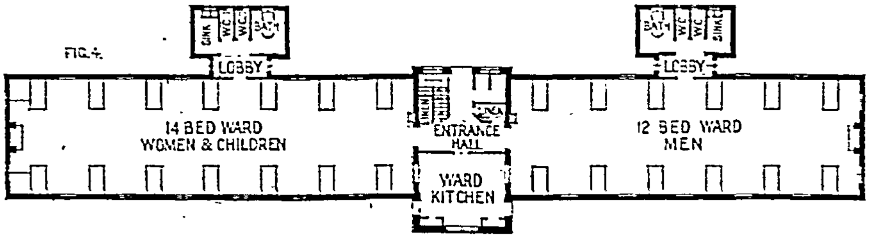

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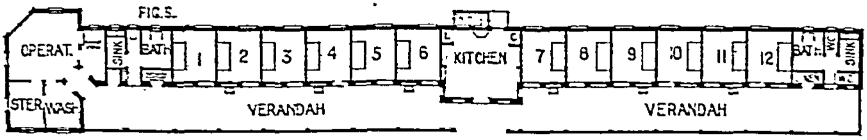

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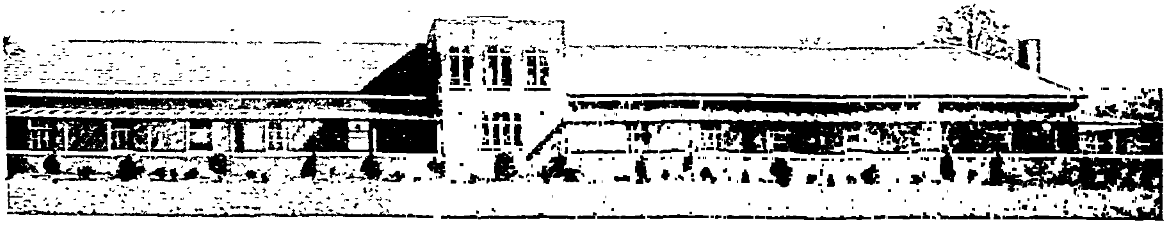

FIG. 3.—One of the "convalescent" ward blocks.

are electrically driven machines for various culinary processes. The prepared meals are delivered from the central kitchen to the wards, &c., in trolleys fitted with electrically heated containers.

The administrative building is sufficiently large to meet possible future extension of the hospital proper.

The hospital proper has 148 beds, distributed as follows: 28 beds in each of the three "acute" ward blocks, 26 beds in each of the two convalescent ward blocks, and 12 beds in the cubicle ward block.

THE "ACUTE" WARD BLOCKS

In each of the "acute" blocks there are two main wards containing 14 beds and 12 beds respectively and two single-bed wards. It will be observed (Fig. 1) that the two extensions containing the single-bed wards are located in the front of the block—one at each side of the central entrance—giving relief to the front elevation.

Each of the single-bed wards (Fig. 2) is self-contained—i.e., with its own bathroom, containing bath, lavatory, and w.c. Besides having access from the main ward, each single-bed ward has access from the lobby in the general entrance to the block and also direct access from outside. This enables the single-bed ward to be put to various uses; it might be used for a paying patient; it can be used for an especially severe case of the same disease as is under treatment in the main ward adjoining; or again it can be used for a case of a different disease from that under treatment in the main ward adjoining.

The two main wards are of such dimensions that there is a floor space of 144 sq. ft. per bed and a wall space of 12 ft. linear per bed. The wards are 12 ft. high. The two sanitary annexes are located at the rear of the block; each is placed midway along the posterior wall of the ward it serves, and contains bathroom, two w.c.'s, and a sluice room with bedpan steriliser, &c.

The nurses' ward-kitchen in each block is placed centrally, and leading from it at the rear are a sisters' duty room, linen room, and a room containing lavatory and w.c. for staff.

The arrangement whereby simultaneous observation of the two main wards is obtained from the central ward-kitchen is interesting. Observation of the single-bed ward on each side is enabled by two opposite windows which give a view across the intervening part of the lobby.

THE CONVALESCENT WARD BLOCKS

In each of the two convalescent ward blocks (Fig. 3) there are two main wards containing respectively 14 beds and 12 beds. There are no single-bed wards in these blocks. The entrance to the block is placed at the rear, while the central ward-kitchen faces to the front. A day room, approached by stairs from the entrance hall, is formed over the central part of the block at first-floor level.

Along the front of each ward a spacious verandah (not shown on the plan—Fig. 4) is provided; each verandah has access both from the ward-kitchen and from the ward it serves. The verandahs are comparatively low and very "deep" from front to back, and there is a "footing" wall in front; these are simple but indispensable points in a verandah which is to give adequate protection from the weather.

THE CUBICLE BLOCK

The cubicle block (Fig. 5) contains 12 beds, each of which is placed in a separate cubicle 12 ft. by 10 ft. The block also includes a nurses' ward-kitchen, stores, and two sanitary annexes each containing bathroom, one w.c., and a suitably equipped sluice room.

The sanitary annexes are placed one at each end of the block. Along the front of the whole block is an adequate verandah. On the latter and affixed at intervals to the outer aspect of the front wall of the block are six lavatory basins—three on each side of the central entrance to the block. These are, of course, to enable the physician, passing along the verandah from cubicle to cubicle—i.e., from one type of infection to another—to perform the necessary hand ablutions en route. In connexion with these externally placed basins, the water-supply pipes and the waste-pipes are so placed as to afford protection from the possible effects of frost—an elementary but noteworthy point.

From the central ward-kitchen, through observation of the 12 cubicles—six on each side—is enabled by means of glass panels in the dividing walls. In this connexion the perspective view of the cubicles is notably improved by the scheme of their internal decoration; six of the cubicles are finished in one colour and six in another, the cubicles of one colour alternating with those of the other. This simple expedient clearly "picks out" the individual cubicles as they are seen from the ward-kitchen.

The small operating theatre is attached to one end of the cubicle block. It contains a theatre, sterilising room, wash-up room, and blanket store.

MATERIALS AND TECHNICAL SERVICES

The floors of all wards are of "jarrah" wood boarding (Australian). The floors of lobbies, ward-kitchens, sanitary annexes, operating theatre unit, and the like are of terrazzo. The doors in the wards are of Canadian pine and the window frames of metal. The walls are rendered in plaster and finished with best washable paint. All corners and joints between floors and walls are well rounded. The internal decorations of the wards are carried out alternately in shades of sunshine yellow and pale green, while the vestibule of each ward block is finished in aluminium. In the scheme of electrical lighting, artistic lamp fittings are a feature, and in all wards there is a shaded wall light to each bed. A system of panel heating gives an adequate and even distribution of heat in the wards.

The technical services are grouped together in the power block. The laundry contains three separate receiving rooms for staff linen, patients' linen, and foul linen respectively. A full-sized steam disinfector is installed. The boiler house contains the heating and hot-water supply plant, and a small engineer's workshop. Adjacent to the boiler house is a water-softening plant. Garage accommodation is provided for three motor ambulances and for three other vehicles. Complete inter-communication between the buildings is secured by a system of internal telephones. A fire alarm system gives direct contact with the city fire station. The mortuary, attached to the power block, has accommodation for six bodies, and includes a post-mortem room and a viewing room.

COST

The cost of the hospital (excluding site) will be in the region of £113,000. The land comprising the site has been in the possession of the corporation for many years; the portion now occupied by the hospital is valued at £8000. This works out at about £820 per bed. The new hospital supersedes the old city hospital of 102 beds, which has been sold by the corporation to the Coventry and Warwickshire Hospital, to which it is adjacent.

ST. JOHN'S HOSPITAL FOR DISEASES OF THE SKIN. The report for 1933 states that, notwithstanding the additional accommodation, there is still a waiting-list. There is an even more pressing need for a ward for children under three years of age, and the provision of pay-beds will have to be considered seriously "when times are more propitious." The out-patient department is congested, but the cost of rebuilding the hospital to incorporate the in- and out-patients' departments would be £60,000. In-patients last year contributed £968 and out-patients £1779; the excess of total income over total expenditure was £2171.

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In each of the "acute" blocks there are two main wards containing 14 beds and 12 beds respectively and two single-bed wards. It will be observed (Fig. 1) that the two extensions containing the single-bed wards are located in the front of the block —one at each side of the central entrance—giving relief to the front elevation.

Each of the single-bed wards (Fig. 2) is self-contained—i.e., with its own bathroom, containing bath, lavatory, and w.c. Besides having access from the main ward, each single-bed ward has access from the lobby in the general entrance to the block and also direct access from outside. This enables the single-bed ward to be put to various uses; it might be used for a paying patient; it can be used for an especially severe case of the same disease as is under treatment in the main ward adjoining; or again it can be used for a case of a different disease from that under treatment in the main ward adjoining.

The two main wards are of such dimensions that there is a floor space of 144 sq. ft. per bed and a wall space of 12 ft. linear per bed. The wards are 12 ft. high. The two sanitary annexes are located at the rear of the block; each is placed midway along the posterior wall of the ward it serves, and contains bathroom, two w.c.'s, and a sluice room with bedpan steriliser, &c.

The nurses' ward-kitchen in each block is placed centrally, and leading from it at the rear are a sisters' duty room, linen room, and a room containing lavatory and w.c. for staff.

The arrangement whereby simultaneous observation of the two main wards is obtained from the central ward-kitchen is interesting. Observation of the single-bed ward on each side is enabled by two opposite windows which give a view across the intervening part of the lobby.

THE CONVALESCENT WARD BLOCKS

In each of the two convalescent ward blocks (Fig. 3) there are two main wards containing respectively 14 beds and 12 beds. There are no single-bed wards in these blocks. The entrance to the block is placed at the rear, while the central ward-kitchen faces to the front. A day room, approached by stairs from the entrance hall, is formed over the central part of the block at first-floor level.

Along the front of each ward a spacious verandah (not shown on the plan—Fig. 4) is provided; each verandah has access both from the ward-kitchen and from the ward it serves. The verandahs are comparatively low and very "deep" from front to back, and there is a "footing" wall in front: these are simple but indispensable points in a verandah which is to give adequate protection from the weather.

THE CUBICLE BLOCK

The cubicle block (Fig. 5) contains 12 beds, each of which is placed in a separate cubicle 12 ft. by 10 ft. The block also includes a nurses' ward-kitchen, stores, and two sanitary annexes each containing bathroom, one w.c., and a suitably equipped sluice room.

The sanitary annexes are placed one at each end of the block. Along the front of the whole block is an adequate verandah. On the latter and affixed at intervals to the outer aspect of the front wall of the block are six lavatory basins—three on each side of the central entrance to the block. These are, of course, to enable the physician, passing along the verandah from cubicle to cubicle—i.e., from one type of infection to another—to perform the necessary hand ablutions en route. In connexion with these externally placed basins, the water-supply pipes and the waste-pipes are so placed as to afford protection from the possible effects of frost—an elementary but noteworthy point.

From the central ward-kitchen, through observation of the 12 cubicles—six on each side—is enabled by means of glass panels in the dividing walls. In this connexion the perspective view of the cubicles is notably improved by the scheme of their internal decoration; six of the cubicles are finished in one colour and six in another, the cubicles of one colour alternating with those of the other. This simple expedient clearly "picks out" the individual cubicles as they are seen from the ward-kitchen.

The small operating theatre is attached to one end of the cubicle block. It contains a theatre, sterilising room, wash-up room, and blanket store.

MATERIALS AND TECHNICAL SERVICES

The floors of all wards are of "jarrah" wood boarding (Australian). The floors of lobbies, ward-kitchens, sanitary annexes, operating theatre unit, and the like are of terrazzo. The doors in the wards are of Canadian pine and the window frames of metal. The walls are rendered in plaster and finished with best washable paint. All corners and joints between floors and walls are well rounded. The internal decorations of the wards are carried out alternately in shades of sunshine yellow and pale green, while the vestibule of each ward block is finished in aluminium. In the scheme of electrical lighting, artistic lamp fittings are a feature, and in all wards there is a shaded wall light to each bed. A system of panel heating gives an adequate and even distribution of heat in the wards.

The technical services are grouped together in the power block. The laundry contains three separate receiving rooms for staff linen, patients' linen, and foul linen respectively. A full-sized steam disinfector is installed. The boiler house contains the heating and hot-water supply plant, and a small engineer's workshop. Adjacent to the boiler house is a water-softening plant. Garage accommodation is provided for three motor ambulances and for three other vehicles. Complete inter-communication between the buildings is secured by a system of internal telephones. A fire alarm system gives direct contact with the city fire station. The mortuary, attached to the power block, has accommodation for six bodies, and includes a post-mortem room and a viewing room.

COST

The cost of the hospital (excluding site) will be in the region of £113,000. The land comprising the site has been in the possession of the corporation for many years; the portion now occupied by the hospital is valued at £8000. This works out at about £820 per bed. The new hospital supersedes the old city hospital of 102 beds, which has been sold by the corporation to the Coventry and Warwickshire Hospital, to which it is adjacent.

St. John's Hospital for Diseases of the Skin. The report for 1933 states that, notwithstanding the additional accommodation, there is still a waiting-list. There is an even more pressing need for a ward for children under three years of age, and the provision of pay-beds will have to be considered seriously "when times are more propitious." The out-patient department is congested, but the cost of rebuilding the hospital to incorporate the in- and out-patients' departments would be £60,000. In-patients last year contributed £968 and out-patients £4779; the excess of total income over total expenditure was £2171.

PANEL AND CONTRACT PRACTICE

Vexed Points in Certification

CERTIFICATION continues to receive attention from the approved society side, as it may well do, for on its adequate performance depends stability for their funds. At a recent conference between representatives of the Insurance Acts Committee and of approved societies a consensus of opinion was reached in relation to certificates given to pregnant women.

(*a*) That a medical certificate shall be held to be inadequate if it certifies the incapacity for work of the insured person on the ground of pregnancy alone.

(*b*) That a medical certificate shall be held to be inadequate if it certifies the incapacity for work of the insured person on the ground of pregnancy even with an indication of the period of pregnancy.

(*c*) That a medical certificate shall be held to be adequate if it certifies the incapacity for work of the insured person on the grounds of pregnancy and some disabling associated condition.

(*d*) That a medical certificate shall be held to be adequate if it certifies the incapacity for work of the insured person on the grounds of pregnancy, plus an indication of the period of pregnancy, and plus the character of the employment of the insured person.

DIAGNOSIS

The expression on the certificate of the nature of the incapacity is also under review. Societies complain that medical practitioners do not often give them sufficient information as to what is the matter with a patient; they receive certificates week after week for the same symptom, such as diarrhœa. This may be the correct cause of an insured person being unable to work, but it does not enable the society to form an opinion whether the case is likely to be a long or short claim upon its funds, nor can its sickness visitor decide whether home conditions are such that the member is taking proper care of himself or that the doctor's instructions are being carried out. Practitioners may be roughly grouped into two classes; those who frequently change the name of the incapacity entered up on the certificate, according to the condition of the patient, and those who do not.

For example, a doctor in the former group might issue a series of certificates week by week to the same patient, such as pyrexia, bronchial catarrh, influenza, pleurisy, pneumonia, emphysema, *discharging sinus, debility following*, &c. The risk he used to run was from the society's official concluding "this doctor obviously does not know what is the matter with this case: the diagnosis keeps changing—better send it to the regional medical officer." On the other hand the doctor who starts with the certifying a case of influenza as influenza, and repeats this as the cause of incapacity, runs the risk of the official saying "influenza does not as a rule last more than three weeks, something must be wrong here—better send it to the regional medical officer."

Probably in these days, with more experienced officials inspecting and scrutinising certificate forms, it is better to change the diagnosis of the cause of incapacity according to the stage of the illness rather than to adopt the second method of always using the same term.

PROGNOSIS

Society representatives report that extraordinarily few certificates ever have filled up on them the space provided for remarks or the date on which the patient should come to see the doctor again. It is thought that the use of this latter provision might considerably reduce the amount of money paid out in sickness benefit. Patients are apt to attend weekly and unless told on Monday to come again on (say) Wednesday, when they might probably be given a final certificate, they do not turn up again until the following Monday when, if they then get a final certificate, they will be be receiving about five days pay more than if they had been signed off as soon as thought to be fit for work. It has been suggested, though never seriously considered by either side, that possibly some wording might be added to the present certificate form under which the doctor might be asked in the first intermediate certificate to say approximately how long the illness would be likely to last, in such terms as: "You should in all probability be fit to resume work in —— days time." This would have the effect of putting the certifying doctor on his mettle to estimate as accurately as possible the severity of the trouble. It would inform the society as to how serious the doctor thought the incapacity was; the patient would realise quite early in trivial cases that the doctor did not think there was much the matter and, with some patients very loyal to their doctors, they would often do their utmost to be fit to time so as not to let their medical man down with the approved society.

The Post-office form of certificate for the employee contains a somewhat similar form of words. There it works smoothly and is found helpful to officials administering sick funds. No one could of course be accurate in such estimation of duration of incapacity and mistakes would be certain to occur in every doctor's prognosis, but results reviewed in aggregate would indicate the careless certifier, the percentage of his errors being much above the average.

FITNESS FOR HOUSEWORK

Recently Mr. Parkinson asked the Minister of Health in the House of Commons if he has authorised the decision that when an insured person who is in receipt of National Health Insurance benefits is certified by a medical officer as being able to do housework, though unable to follow her usual occupation, her benefits shall cease even though she intends to resume her own occupation as soon as her health will permit. The reply of the Minister is illuminating. He said there was no general decision that an insured woman who, though unable to follow her usual occupation is able to do housework, is to be treated as not entitled to sickness or disablement benefit. An approved society would not ordinarily regard such a woman as disentitled to benefit pending her early return to her normal employment. But in the case of a woman who is the domestic head of a household, and for whom accordingly the performance of household duties is in the nature of an alternative to her industrial employment, fitness for the former as well as for the latter form of work would probably be taken into consideration. Every case was to be considered on its merits and any woman who is dissatisfied with the decision of the society is entitled to appeal in accordance with the rules.

This question of housework is frequently raised by approved societies when sending cases to the regional medical officer. Insurance practitioners are not asked to certify on this question, they certify whether the insured person is fit to return to her normal employment. The position is not without difficulty for both parties, and it frequently arises on so-called Class K cases where a woman with employment ceases work on marriage and never intends to return to that employment. Some incapacity arises for which she claims a financial benefit under the

Act; what standard of employment is to be considered as applicable in such a case? Certainly not the last occupation, because that is finished for good; probably the housework standard is the fairest—the ability to do unaided the ordinary household duties of a working-class home. It will be noted in the Minister's reply that he suggests to any one dissatisfied that she should appeal. The result of such an appeal would be interesting. The decision on payment of financial benefit rests with the society, which would have to justify its decision before the appeal tribunal.

Temporary Residents

Dr. W. L. HARDMAN (Grange-over-Sands) writes: "Having read the note in THE LANCET of April 14th (p. 813) on remuneration for the temporary residents in a convalescent home, I thought it might interest you to know the point of view of a doctor who is distinctly dissatisfied with the rate of pay for these patients. This afternoon I have seen 25 patients, four of whom I considered needed treatment, and whose cards I took. For this work (2 hours) I receive 2s. 2d. or 6½d. each. I have to see all the new arrivals in case they are ill while resident there, but cannot take their cards, as evidence of treatment has to be given before pay is made. The other night at 10.30 P.M. I had to see a man and take him to hospital (16 miles away), arriving back at 2 A.M.; there is no appearance of receiving any extra pay for this man—just his 6½d. Quite often one has to see a man whose card one has not had in an emergency. As all these men (or women) have to be seen, I think the rate of pay should be higher."

OBITUARY

FREDERIC NEWTON GISBORNE STARR, C.B.E., M.D. Toronto, F.A.C.S.

THE death is announced by telegram as having occurred on April 21st of Dr. Frederic Newton Gisborne Starr, emeritus professor of surgery in the University of Toronto. His reputation as a surgeon was a distinguished one in Canada, in the United States, and in this country.

Prof. Starr was born in 1867 at Thorold, Ontario, the son of the Rev. Joseph Starr, and received his education at the High School, Toronto, and at the University in the city. He graduated as M.B., C.M. in 1889 and specialised in surgery from the beginning of his career, the greatest part of which was spent in Toronto. After holding numerous resident posts he was appointed surgeon to the General Hospital, Toronto, and in succession to the Hospital for Sick Children and to the Women's Hospital, and alike as teacher and practical exponent was recognised as a leader in his science. He held a particularly prominent place in medical organisation, his management of affairs being notable. He was for an extended period general secretary of the Canadian Medical Association, and was later a member of the executive of that body, becoming finally president in 1927. He served on the Council of the College of Physicians and Surgeons of Ontario from 1907 till 1911, and was president of that corporation in 1931–32. In the latter year he was elected vice-president of the American Surgical Association, while he was also vice-president of the American College of Surgeons, and during a meeting in Canada of the British Medical Association was chosen as a vice-president of that body. During the war he served with the R.A.M.C. in France with distinction, being mentioned in despatches and receiving the C.B.E. at the termination of hostilities. The figure of no Canadian was more familiar to British surgeons than his.

Prof. Starr married in 1904 Ann Callander, daughter of Mr. G. F. MacKay, of New Glasgow, Nova Scotia, but there was no child of the marriage. He was as widely known in Toronto society as he was in the academic world, being a familiar figure in the sporting and social clubs and associations of the city. His death is deeply regretted.

RICHARD LLEWELLYN JONES LLEWELLYN, M.B. Lond.

THE death is announced as occurring on Thursday, April 19th, of Dr. Richard Llewellyn Jones Llewellyn, who was well known in association with the treatment of rheumatism and allied conditions. He died in his sleep.

Dr. Jones Llewellyn was the son of an officer in the R.A.M.C., Major Morris Jones, of Aberystwyth, and was educated at Epsom College, University College, London, and the University of Wales. He qualified in 1894 as L.S.A., and in the following year graduated as M.B. Lond., taking also the English double qualifications. After being surgical assistant in the out-patient department at University College Hospital, he was for a time a resident medical officer in the Durham County Asylum, after which he started in medical practice in Aberystwyth. Later, and being by this time particularly interested in the numerous problems associated with arthritis and allied rheumatoid conditions, he commenced practice as a specialist in those disorders at Bath, and was appointed physician to the Royal Mineral Water Hospital at Bath. He now wrote voluminously on the subject, among his earlier contributions to medical literature being a book written in association with his brother, Dr. A. Bassett Jones, of Llandrindod, on fibrosis and neuritis, muscular rheumatism, and sciatica, a work which met with considerable approval and went into a second edition. Other contributions from his pen on the same subjects appeared in Latham's and English's System of Treatment, while he also wrote a treatise on gout, which was translated into French. Llewellyn possessed a picturesque and forcible style and his messages were always clearly delivered.

During the war Llewellyn, as a member of the Central Appeal Tribunal of the Ministry of Pensions, continued to impress upon the profession and the public the gravity of rheumatism as a menace to national efficiency, developing his arguments in a book on the principles which should regulate the evaluation of pensions, and writing and speaking much on his thesis and on malingering. The book was written in collaboration with his brother and the late Mr. W. M. Beaumont, the ophthalmologist. Llewellyn was a member of the Conference on Chronic Arthritis and Allied Rheumatoid Conditions convened by the Medical Research Council, and took an active share in starting an inquiry into the systematic prevention and relief of diseases in children. He held office in the section of physical medicine of the Royal Society of Medicine and was also president of the balneological and clinical section. Recently he had become interested in the possible association between rheumatic symptoms and certain dermatological conditions, and on the agenda for the next meeting of the Medical Society of London is the announcement of a paper by him (which will be read by Dr. D. F. Fraser Harris) on the skin in relation to rheumatism in childhood and after puberty.

Dr. Llewellyn, who took the additional surname of Llewellyn on that occasion, married in 1911 the Hon. Avis M. Blennerhasset, only child of the fourth Lord Headley and widow of Mr. D. H. Crosse.

ANDREW McFARLANE, M.D., M.R.C.P., D.P.H.

THE death occurred recently of Dr. Andrew McFarlane, who had recently been appointed medical officer of the Scottish Board of Health, and who had previously made his mark by his organising work as deputy medical officer, Darlington.

Andrew McFarlane, the son of James McFarlane, J.P., was born at Leadhills in 1898, and educated at Biggar Grammar School and the University of Edinburgh. He graduated as M.B., Ch.B. with honours in 1922, proceeded to the M.D. degree in the following year, took the M.R.C.P. Edin. in 1926, and the D.P.H. Edin. in 1927. His early professional life was a full one, for after filling the appointment of house physician to the Edinburgh Royal Infirmary, he was clinical tutor at the infirmary for a year. Next followed one year as R.M.O. at the Ministry of Pensions hospital, while later he was medical officer to the Tuberculosis Hospital in Edinburgh, and served as clinical assistant in the venereal department of the Royal Infirmary and at the Edinburgh Tuberculosis Dispensary. He was now for a brief time assistant medical officer to the Surrey county council, but in 1929 became deputy medical officer at Darlington, holding the post of assistant medical officer for education purposes and medical officer for venereal diseases. His work received the highest commendation from his superior officer, and when he decided to apply for the vacant post of medical officer to the Scottish Board of Health he had in his support a fine record of academic and practical success. In this last appointment he unfortunately never had any opportunity of displaying his talents, for illness prevented him from taking up the post, and after more than one unsuccessful operation he died at the early age of 36.

DAVID LECHMERE ANDERSON,

L.R.C.P. & S. Edin., D.P.H. Edin. & Glasg.

WE regret to announce the death of Dr. David Lechmere Anderson, the well-known medical officer of health for Doncaster, which occurred on Wednesday, April 18th, at his home in that town. Although his death was not expected he had been in bad health for several weeks.

Dr. Anderson received his medical education in Edinburgh and took the double diploma of the Edinburgh Colleges in 1883, being then only just of age. He was a promising student and a medallist of the University of Edinburgh. He was for a period in general practice but, deciding to devote his time to State medicine, became M.O.H. for the borough of Peterhead and Ellon. In 1902 he was appointed M.O.H. for Doncaster, where in virtue of his office he was also medical inspector of schools and medical superintendent of the infectious diseases hospital, while he was also certifying factory surgeon. It was in relation to his interest in industrial disease that his best piece of work was done, when he made an inquiry into the possibility of reducing the amount of miners' nystagmus in the coal-fields. The inquiry was published in the *British Medical Journal* in 1920, and Anderson went closely into the relation of age as a factor in the production of miners' nystagmus, inquired into causation and the influence of heredity, and closed with a practical suggestion for the standard of admission to pit life judged by the normality of vision. He suggested that no youth should start work in a mine with imperfections of vision, while he attributed the disease, as others did, mainly to the bad lighting of the galleries in the coal-fields coupled with the abnormal postures which it was necessary for the miners to adopt. Dr. Anderson showed versatility, also, by contributing not only with frequency to the press upon health subjects but by writing serial fiction under the name of David Lechmere. He was a recent widower, but leaves a son in the medical profession.

NORMAN LAVERS, M.D. Brux., L.R.C.P. Lond., M.R.C.S. Eng.

BY the recent death of Dr. Norman Lavers, medical superintendent of Bailbrook House, Bath, the profession has lost a practitioner well known for his practical work as a medico-psychologist. A Tasmanian by birth, he received his medical training at Guy's Hospital medical school and qualified with the English double diplomas in 1896, proceeding later to the M.D. Brux. His professional life was spent in the institutional treatment of nervous disorders. His first post was as resident at Camberwell House, London, and after service there as senior medical officer he was appointed medical superintendent of the Canterbury City and Borough Asylum. He showed himself particularly interested in the neurological problems presented by his charges, and wrote shrewdly on the clinical aspects of functional disorder. He was then appointed superintendent of Bailbrook, Bath, and during the war held a temporary commission in the R.A.M.C., becoming consultant in nervous disorders to the Bath War Hospital. He had retired from professional work at the time of his death, but he held the post of medical superintendent of Bailbrook for over 20 years and earned a reputation for sound and scientific work.

BIRMINGHAM'S SPECIALIST HOSPITALS.—The annual reports are now published of the Birmingham and Midland Eye Hospital, the Birmingham and Midland Ear and Throat Hospital, and the Birmingham and Midland Skin Hospital. Last year the Eye Hospital treated 44,350 new out-patients, of whom over 26,000 were casualty cases. There were 1611 in-patients in the public wards and 117 private patients. The public patients showed a reduction of 234, which is attributed mainly to fewer cases of infantile ophthalmia. The follow-up work in connexion with cases of ophthalmia neonatorum continues to be attended with marked success. It was stated at the annual meeting that the time cannot be far distant when a complete rebuilding scheme will have to be considered, and that the nurses' home must shortly be rebuilt. The Ear and Throat Hospital is also in need of larger accommodation. The Skin Hospital is to have a new in-patient department at 35, George-road, Edgbaston, formerly a nursing-home. The existing house is to be utilised as a nurses' home, and the wards and their accessories will be housed in a new three-floor block. There will be 14 beds and a private ward for men, a similar number for women, with three private wards, a 16-bed ward, and three private wards for children. The present in-patient accommodation will thus be increased by 29 beds; the existing premises in John Bright-street will continue to be used as the out-patient department.

CORRESPONDENCE

THE BLOOD-BRAIN BARRIER IN INFECTIOUS DISEASES

To the Editor of THE LANCET

SIR,—I have been much interested in Prof. Friedemann's paper, especially in regard to the mode of action of diphtheria toxin. Like Dr. Goodall, I had not expected to find the ultimate action of diphtheria toxin ascribed to an effect on the brain or higher centres, and I am in complete agreement with him that all clinical observation points to a peripheral action. I cannot however go all the way with him in thinking that circulatory changes are chiefly peripheral, if by that, as I rather gather from his preceding remarks, he means chiefly vascular. The profound disturbances in heart rhythm, and the gross degenerative changes noted in both contractile and conductile tissues on histological examination, in my opinion point to a direct primary action of the toxin on the heart itself. While there can be no doubt that the changes in the peripheral circulation are also important, I must agree with Warthin that the essential lesion in the majority of cases of heart failure in diphtheria is in the myocardium itself. I am, Sir, yours faithfully,

ALEX. JOE.

North Western Hospital, Hampstead, N.W., April 23rd.

SAFE MILK

To the Editor of THE LANCET

SIR,—I congratulate Major Lings on the outspokenness of his letter in your last issue in regard to loose milk delivery. In view of the Government's proposal to grant funds for milk publicity and for the encouragement of milk production, I think it is very important that the equally vital distributive link in the chain of supply should not be overlooked. It is obviously sound to synchronise steps for the improvement of supplies on the farm, in order to restore public confidence in milk, with propaganda for its increased consumption; but it is equally advisable to ensure that any raising of production standards is not neutralised by a reverse tendency in the distributive sphere.

At the moment one finds in almost every town retailers of raw milk and pasteurised bottled milk working side by side on exactly the same margin, despite the fact that an extra expenditure of at least 2*d.* to 2½*d.* a gallon is incurred by the second class of distributor in respect of processing and bottling undertaken with a view to rendering supplies as safe and reliable as possible. This is obviously quite inequitable and, in view of the Board's demand for still further reductions in the margin, can only mean that unless some discrimination is made there will be a tendency for the standard of distribution to retrogress rather than progress.

Now that the industry is highly organised, there appears to be no insurmountable difficulty, however, in arranging for the margin to be fixed on the basis of the distributing costs of raw milk, while firms who supplied pasteurised bottled milk received a rebate from the Board adequate to cover the average costs of this service. The retail selling price would of course remain the same in both cases. The Board would then receive a better average return on liquid milk sales as a whole, since instead of a margin of 1*s.* on all milk, 9½*d.* only would be allowed, subject to a rebate as above, while a higher standard of distribution would be encouraged for the good of the industry as a whole.

Unless and until there is a definite inducement for the retailer to turn over from the unhygienic system of loose milk delivery, I am dubious whether funds voted for improving the milk-supplies of the country will achieve their object—increased public confidence. And, unless the latter can be achieved, expenditure on advertising will certainly not bring the results which would otherwise accrue.

I am, Sir, yours faithfully,

Shalford, Surrey, April 20th. VALDER GATES.

THE RECOGNITION OF CHIROPODY

To the Editor of THE LANCET

SIR,—In the leading article of the last issue of THE LANCET, on the recognition of chiropody, Sir Henry Brackenbury is reported as saying: "What was he to do if a patient came to him with a bunion which he did not care to treat? He considered it common sense that such sufferers should go to the chiropodist."

I feel sure that the medical profession welcomes the recognition of chiropody, which by the definition agreed upon includes the treatment of all superficial excrescences occurring on the feet, such as corns, warts, callosities, and bunions. It would, however, be a pity for a medical man to advise chiropody in the case of a patient suffering from a bunion without considering the merits of the case; for the various treatments given by chiropodists for bunions are palliative and fail to get to the root of the trouble. There are alternative lines of treatment and it may require considerable experience to decide which is the most appropriate.

We meet cases in which chiropody has failed, not because it was badly done, but because it was not the right treatment; and it will be a pity if chiropodists are to be saddled with the care of such cases, for failure will bring their methods into disrepute.

I am, Sir, yours faithfully,

Portland-place, W., April 23rd. A. T. FRIPP.

TOBACCO SMOKING AND DUODENAL ULCER

To the Editor of THE LANCET

SIR,—In reply to Dr. Askey there is, I think, no doubt that the smoking of a given amount of tobacco on an empty stomach produces a much greater "nicotine effect" than the smoking of an equal amount of tobacco after a meal. This phenomenon is common to all forms of smoking and is not peculiar to cigarette smoking. The normal mode of entry of nicotine into the system is by its distillation from the hot tobacco into the mouth, where it dissolves in the saliva, is swallowed, and finally is absorbed into the blood from the stomach or small intestine or both. When the stomach is full the nicotine-saliva is diluted by the gastric contents and possibly some of the nicotine is destroyed by the digestive juices, consequently the amount of nicotine absorbed is less.

That the swallowing of tobacco dust by the cigarette smoker materially adds to the amount of nicotine absorbed seems to me very unlikely, for if it did we should expect to find cigarette smoking producing a greater nicotine action than the smoking of an equal quantity of tobacco in a pipe, whereas the reverse is true; but this does not mean that the swallowing of tobacco dust is unimportant, for if tobacco itself is swallowed there may be toxic substances other than nicotine present in the gastric "brew." If this latter hypothesis is correct one would expect to find a high incidence of duodenal ulcer among tobacco chewers, but whether or not this is so, I do not know.

I agree that the question of smoking before meals should be investigated, though I do not see why breakfast especially should be incriminated. My own view is that for the prospective duodenal ulcer patient ordinary (non-inhaling) cigarette smoking is possibly harmful, inhalation of cigarette smoke is harmful, and inhalation on an empty stomach is very harmful.—I am, Sir, yours faithfully,

O. A. TROWELL.

Dept. of Physiology, University of Liverpool,
April 23rd.

PARAPHARYNGEAL ABSCESS

To the Editor of THE LANCET

SIR,—On p. 878 of your current number you print an abstract of an article by MM. J. Piquet and P. Coumouma on lateral pharyngeal abscess. This is, I feel sure, the condition I described four years ago in your columns (1930, i., 792) as "parapharyngeal abscess." As the authors point out this is not a peritonsillar abscess, but is situated externally to the wall of the pharynx. They state that it arises in the lymph glands about the carotid sheath; but I still maintain that although cervical gland suppuration may occur in some cases, the essential feature is "a suppuration in the bucco-pharyngeal aponeurosis behind the palato-pharyngeus muscle and posterior faucial pillar. It tends to point in the pharynx about the level of the lower pole of the tonsil, in the potential gap between the palato-pharyngeus muscle in front, the lower border of the superior constrictor above, and the stylo-hyoid ligament (with the middle constrictor) behind." And it can be readily opened in this situation—far more readily than by the external route that MM. Piquet and Coumouma advocate for adults—the internal route being kept for children. It is an important condition to recognise, owing to its immediate relations with the great vessels of the neck, which have been eroded in several recorded cases: and it can be readily distinguished clinically from peritonsillar abscess—reserving this term for suppuration between the capsule of the tonsil and the sinus tonsillaris.

I am, Sir, yours faithfully,

Clifton, Bristol, April 20th. E. WATSON-WILLIAMS.

BROMIDE OF STRONTIUM IN EPILEPSY

To the Editor of THE LANCET

SIR,—Many years ago I wrote a letter to THE LANCET (1912, i., 1644) with reference to the treatment of epilepsy with bromide of strontium. Experience since then has confirmed me in the belief that the treatment of epilepsy with this salt is far superior to that with other bromides. The dose of ʒi. for adults is well borne and does not cause depression. I have had many cures by its use. Details of all these cases are in my case book, which I should be happy to submit to any competent authority for consideration.

As I am in my 79th year, I am anxious that this form of treatment should not be lost sight of, but be carried on by others.

I am, Sir, yours faithfully,

M. R. CALLENDER,
Surgeon.

Bridgwater, April 16th.

SURVIVAL AFTER 600 GRAINS OF ASPIRIN

To the Editor of THE LANCET

SIR,—In view of the fact that the largest dose of aspirin taken without fatal result appears to be 485 grains, as recorded in Martindale's Extra Pharmacopœia, it is of interest to report a case of attempted suicide in which 600 grains of aspirin failed to have the desired result. A man aged 48 years, after a drinking bout, swallowed 120 five-grain tablets at midnight. An hour and a half later he became violently sick and continued to vomit until about 11 o'clock the following morning. When I first saw him at 7 P.M. on the same day he was comparatively comfortable and required no active treatment. His symptoms had been, at first, a very acute but transitory attack of perspiration and then the intensive vomiting, which no doubt saved his life. He was still complaining of a "rushing feeling" in his head and neck. Against advice he was up and about his work in a couple of days.—I am, Sir, yours faithfully,

Edinburgh, April 17th. S. LIPETZ.

MORTALITY AFTER PROSTATE OPERATIONS

To the Editor of THE LANCET

SIR,—Sir Francis Shipway has been good enough to point out to me that, in my two letters (THE LANCET, 1931, i., 1423, and ii., 325) reporting a series of 402 cases of prostatectomy operated on under a combination of a very small amount of spinal and general anæsthesia, I had omitted to mention whether the short or the longer operation was used. To make the report more complete I should like to say that in all these 402 cases it was the short operation, without exposing the bladder, which was used. In my experience the above-mentioned method of anæsthesia is also the best for the longer operation but a little more of the spinal anæsthetic must be used. I am, Sir, yours faithfully,

London, April 20th. H. M. PAGE.

A BUDGET REACTION.—We have received from a group of co-signatories, partly medical, a letter criticising the Budget, in that the Chancellor, "has failed to apply his first principle of using his surplus to relieve those classes who suffered most when the crisis was acute. . . The Children's Allowance still stands at 2s. a week; the Means Test is still enforced; while the cost of Statutory Benefit to the unemployed is still borne to a large extent by working class families." As a protest the writers have decided to send a part of the benefit accruing to them from the reduction in the income tax to the following two organisations: the Committee against Malnutrition, 19c, Eagle-street, London, W.C.1, and the Children's Minimum Committee, Thames House, Millbank, London, S.W.1. They hope that the example will be followed by others.

GOLDEN-SQUARE THROAT HOSPITAL.—At the annual meeting last week it was reported that although the year's income had fallen by £3465, expenses had also been reduced and the year ended with a small credit balance. It has been decided to reduce the number of private wards and to form them into a single wing. The remainder of what were previously private wards are to be devoted to contributory patients under special conditions. It is hoped that this will stimulate further use of the private wards and help the revenue of the hospital.

PUBLIC HEALTH

List of Special Schools

THE list of special schools issued by the Board of Education is indispensable for the medical officer seeking accommodation for an abnormal child, whether deaf, blind, epileptic, crippled, delicate, mentally defective, tuberculous, or otherwise defective. This information is given in Part I.; Part II. contains a list of institutions providing higher education for blind, deaf, defective, and epileptic children; Part III. enumerates the recognised nursery schools. The number of schools has not materially altered since the last edition of the list (see THE LANCET, 1930, ii., 308); there are a few additions resulting from adaptation of buildings taken over from the old poor-law and considerably more nursery schools. As before, a school maintained by one authority in the area of another authority is entered under the latter, but is also given under the authority maintaining it—e.g., the L.C.C. residential school for the deaf at Anerley is entered under Kent (Penge), but is also given under the London special schools. A glance through the list still reveals the great lack of accommodation for the epileptic and the children with combined defects, otherwise in many areas the provision is nearly adequate. The booklet may be obtained from H.M. Stationery Office or through any bookseller (Pp. 48. 9*d*.).

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED APRIL 14TH, 1934

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 3 (last week 6); scarlet fever, 2652; diphtheria, 1000; enteric fever, 24; acute pneumonia (primary or influenzal), 1485; puerperal fever, 61; puerperal pyrexia, 129; cerebro-spinal fever, 28; acute polio-myelitis, 1; encephalitis lethargica, 10; dysentery, 10; ophthalmia neonatorum, 87. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on April 23rd–24th was as follows: Small-pox, 11 under treatment, 1 under observation (last week 1 and 7 respectively); scarlet fever, 1579; diphtheria, 1703; measles, 3420 (last week 3648); whooping-cough, 302; puerperal fever, 37 mothers (plus 12 babies); encephalitis lethargica, 259; poliomyelitis, 4; "other diseases," 116. At St. Margaret's Hospital there were 16 babies (plus 6 mothers) with ophthalmia neonatorum.

Deaths.—In 118 great towns, including London, there was no death from small-pox, 2 (0) from enteric fever, 155 (63) from measles, 22 (6) from scarlet fever, 48 (13) from whooping-cough, 41 (8) from diphtheria, 46 (14) from diarrhœa and enteritis under two years, and 111 (24) from influenza. The figures in parentheses are those for London itself.

Measles is again slightly on the wane. This week there were 11 fatal cases in Liverpool, 8 in West Ham, 7 in Middlesbrough, 6 in Barnsley, 5 each in Newcastle-on-Tyne and Salford, 4 in Dagenham. Bournemouth and Salford each reported one death from enteric fever. Whooping-cough caused 12 deaths in Liverpool, 3 each in Sheffield and Birmingham. Fatal cases of influenza were widely distributed among 48 great towns, the highest number of deaths being reported from Birmingham 15, Liverpool 10.

The number of stillbirths notified during the week was 303 (corresponding to a rate of 42 per 1000 total births), including 41 in London.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

Bills Advanced

IN the House of Commons on Friday, April 20th, the Registration of Births, Deaths and Marriages (Scotland) (Amendment) Bill passed the report stage and was read the third time.

The Workmen's Compensation (1925) Amendment Bill (which provides for the security of colliery workers in respect of claims for workmen's compensation in cases where the employers become bankrupt) was read the third time.

On Monday, April 23rd, the Birmingham United Hospital Bill was read a second time.

HOUSE OF COMMONS

WEDNESDAY, APRIL 18TH

Foreign Milk and Milk Products

Mr. WILLIAM MORRISON asked the Minister of Agriculture the actual restrictions now in force with regard to the importation of foreign skimmed and full-cream condensed milk, sterilised cream, and milk powder.—Dr. BURGIN (Parliamentary Secretary to the Board of Trade) replied: The foreign governments mainly concerned with the export of condensed milk, milk powder, and cream to the United Kingdom have been asked by His Majesty's Government to make reductions as follows in such exports as from April 1st, the reductions proposed being in each case based on the imports during the same months of the year previous to the introduction of the voluntary arrangements—namely, June, 1932, to May, 1933:—

Condensed skimmed milk.—Reduction of 22½ per cent. for the quarter ending June 30th.

Cream.—Reduction of 30 per cent. for the quarter ending June 30th.

Condensed whole milk and milk powder.—Reduction of 20 per cent. for the time being. The Government has every hope that these proposals will be agreed to.

Imports of condensed milk, milk powder, and cream from foreign countries are also subject to the following customs duties: Condensed whole milk and milk powder, unsweetened, *six shillings* per cwt.; *condensed whole milk*, sweetened, five shillings per cwt., in addition to any duty payable on the sugar content; condensed skimmed milk and milk powder, sweetened, 10 per cent. ad valorem, or the duty payable upon the sugar content, whichever is the larger; cream, 10 per cent. ad valorem.

THURSDAY, APRIL 19TH

Children and Health Insurance

Mr. RHYS DAVIES asked the Minister of Health what reply had been returned to the representations he had received expressing the desire that young persons should, on entering employment after leaving school, be brought within the scope of national health insurance as in the case of young persons under the provisions of the Unemployment Bill now before Parliament.—Mr. SHAKESPEARE (Parliamentary Secretary to the Ministry of Health) replied: My right hon. friend has promised to give the matter careful consideration, but has been obliged to point out the serious financial difficulties which make it impracticable to adopt the proposal at the present time.

Mr. DAVIES: Is the hon. gentleman aware that employers in many parts of the country dismiss boys and girls from their employment when they arrive at the age of 16 because of the contribution to the national health insurance scheme; and in view of the fact that the Unemployment Bill gets over that difficulty in respect of unemployment insurance, will the hon. gentleman look into the subject once more?

Mr. SHAKESPEARE: We have it in mind.

Poor Relief in England and Wales

Mr. **Tom Smith** asked the Minister of Health the number of persons in receipt of poor relief in England and Wales on the last available date, giving separate figures for men, women, and children, and comparable figures for the same period during the past three years.—Mr. **Shakespeare** replied: The total numbers of persons (men, women, and children) in receipt of poor relief in England and Wales (excluding rate-aided patients in mental hospitals, persons in receipt of domiciliary medical relief only, and casuals) on Saturday, March 24th, 1934, and on the corresponding days in 1933, 1932, and 1931 were 1,413,780, 1,357,236, 1,188,077, 1,038,432 respectively. The weekly returns from which these figures have been obtained do not distinguish the numbers of men, women, and children. These particulars can only be obtained from the annual returns as to poor relief on Jan. 1st, and the figures are as follows:—

—	Total persons in receipt of poor relief (excluding rate-aided patients in mental hospitals).			
	Men.	Women.	Children.	Total.
Jan. 1st, 1931 .	288,825	372,237	353,871	1,014,933
,, 1932 .	332,287	406,844	403,894	1,143,025
,, 1933 .	406,708	470,733	498,204	1,375,645
,, 1934 .	420,686	481,661	500,378	1,402,725

Effect of Fire Maroons on Nervous People

Mr. **Hutchison** asked the Home Secretary whether, in order to put an end to the obsolete system of summoning fire brigades by firing maroons whereby much suffering was caused to nervous people, he will circularise local authorities recommending the installation of telephones to ensure that the brigade presented itself promptly on an outbreak of fire.—Sir **John Gilmour** replied: The objections to maroons or sirens as a means of summoning a fire brigade are, I think, generally recognised, but neither I nor my right hon. friend the Minister of Health would feel justified in urging on the smaller brigades the expenditure which the provision of telephones or bells to firemen's houses would entail.

Imports of Milk and Milk Products

Mr. **William Morrison** asked the President of the Board of Trade how much was imported from foreign countries in the months of March, 1933, and March, 1934, of the following substances: skimmed condensed milk, full cream condensed milk, sterilised cream, and milk powder.—Dr. **Burgin** replied: The following table shows the total quantity and declared value of the undermentioned commodities imported into the United Kingdom and registered during March, 1933 and 1934, as consigned from foreign countries.

Description.	March, 1933.		March, 1934.	
	Quantity.	Declared value.	Quantity.	Declared value.
	Cwts.	£	Cwts.	£
Condensed milk—				
Separated or skimmed ..	174,257	177,189	138,919	195,619
Whole	33,982	59,459	27,736	51,935
Cream: fresh ..	6,732	19,917	63	205
Other, including cream in air-tight containers			3,572	11,778
Milk powder ..	4,989	6,233	5,419	6,628

Note.—Particulars of the imports of sterilised cream, included under "cream" in the above table, are not separately recorded in the trade returns of the United Kingdom.

MONDAY, APRIL 23RD

Indian Medical Services

Dr. **John Williams** asked the Secretary of State for India whether the proposal made in the Council of State that recruitment to the Indian medical services should be by simultaneous competitive examination in India had been agreed to by His Majesty's and the Government of India.—Sir S. Hoa The resolution on this subject in the Counci was withdrawn after the Government spokes given reasons why the Government of India c accept it and after an undertaking had been give the debate would be forwarded to me. I have n received any observations from the Government of on the matter.

Dr. **John Williams** asked the Secretary of State India whether he would state the relative proportion Indians to Europeans now serving in the Indian Medica Service.—Sir S. **Hoare** replied: According to information available on March 1st the actual strength of the Indian Medical Service was 385 British officers and 240 Indian officers; 29 of the latter held temporary commissions.

Diseases of Animals Act

Mr. **Glossop** asked the Minister of Agriculture if he was aware that a large consignment of pigs from Sweden to Canada were going to be transhipped within the port of London: and whether steps would be taken to prevent any contravention of the Diseases of Animals Act, which prohibited the bringing of live pigs and other animals to this country from the Continent of Europe.—Mr. **Ormsby Gore** (First Commissioner of Works) replied: Yes, Sir. My right hon. friend has provisionally agreed to authorise this transhipment under conditions prescribed by him and no contravention of the Diseases of Animals Act will be involved.

TUESDAY, APRIL 24TH

Suicides through Gas-stoves

Mr. **Leckie** asked the President of the Board of Trade whether, in view of the increasing number of suicides through gas stoves, he would make inquiries as to the practicability of introducing into coal-gas at the place of manufacture some pungent or disagreeable chemical agent which would render it more difficult for anyone attempting suicide in this way to do so.—Mr. **Runciman** replied: The practicability of introducing irritant or odorous material other than that provided for in the Gas (Carbon Monoxide) Order of 1922 was considered by the Committee on Deaths from Gas Poisoning in 1930, but after reviewing the objections to such addition the Committee decided to make no recommendation in this respect. In accordance with another recommendation a central advisory committee was set up by the industries concerned and I am satisfied that this committee would acquaint me with any development which would render further action practicable.

Milk-supplies to Military Hospitals

Lieut.-Colonel **Heneage** asked the Financial Secretary to the War Office whether the contracts of the hospitals under his control required the purchase of certified, grade A, or ordinary standard milk.—Mr. **Duff Cooper** replied: Tenders are invited for fresh and for pasteurised milk for hospitals, but not for certified or grade A milk. The fresh milk has to comply with the Department's specification and is required to be not below the standard required by the Sale of Milk Regulations, 1901. Unless the cost is excessive, preference is invariably given to pasteurised milk, and this type of milk is being supplied to the majority of military hospitals under the existing contracts.

New Formulæ for Surgical Spirit

Miss **Horsbrugh** asked the Secretary of State for Scotland if he would state on behalf of which local authorities in Scotland he had received representations during the last six months concerning the drinking of methylated spirits and the necessity for further restrictions on its sale; and what action he proposed to take.—Mr. **Skelton** replied: During the last six months, representations in favour of legislation to prohibit or prevent the sale of methylated spirits or kindred spirits for human consumption have been made to my right hon. friend on behalf of the town councils of Aberdeen, Clydebank, Dundee, Edinburgh, Falkirk, Glasgow, Greenock, Inverness, Paisley and Stirling. As from March 15th, 1934, new formulæ for surgical spirit have been brought into operation by the ommissioners of Customs and Excise. It is hoped that ese will render surgical spirit undrinkable, and it is roposed to await the results of this experiment before onsidering whether further measures restricting the sale of methylated and surgical spirits are necessary.

Miss **Horsbrugh** asked if the hon. gentleman would take steps to restrict the sale of methylated spirit which would not be affected by the new formulæ for surgical spirit.

Mr. **Skelton**: I will consider that question.

Blood-tests as Evidence of Paternity

Sir **Francis Fremantle** asked the Home Secretary (1) whether he was aware that, in a recent case of disputed paternity, both parties agreed to accept a blood-test as evidence, and that the magistrates decided the case without such evidence; and whether he would consider the advisability of securing the admission of such evidence on the requisition of either party with retrospective effect, and (2) whether he was aware that blood-tests were accepted in several countries as normal evidence of non-paternity; that this evidence was found to be conclusive in one out of three cases of actual non-paternity; and whether he would take the necessary steps to make such proof admissible in the English courts.—Sir J. **Gilmour** replied: I am advised that if evidence with regard to a blood-test is available, such evidence is admissible under the existing law in this country. Such difficulties as exist appear to be rather of a practical than of a legal character and to arise from the fact that the cost of arranging for such a test would fall on the man concerned and that he would have to secure the coöperation of the woman. I am giving my careful consideration to the whole matter, but if there were any question of compelling persons to submit to a blood-test, legislation would be required for this purpose.

Sir F. **Fremantle** asked if it would be possible for the Home Office to make the fact known to the magistrates of the country that they might accept this evidence, which at present they were refusing.

Sir J. **Gilmour**: I think there is no question that the magistrates are fully aware of that point.

Sir F. **Fremantle** asked whether in cases where magistrates had refused such evidence it would be possible for the case to be reopened.

Sir J. **Gilmour**: No sir. It would be for the magistrates to sum up what was the value of such evidence.

Slum Clearance and Rehousing

Sir **Percy Harris** asked the Minister of Health how many persons in England and Wales displaced by slum-clearance schemes during the last 12 months had been rehoused.—Mr. **Shakespeare**, Parliamentary Secretary to the Ministry of Health, replied: The rehousing accommodation provided during the year ended March 31st, 1934, to replace houses demolished under the Housing Act, 1930, or to abate overcrowding in Improvement areas, was sufficient for the accommodation of 42,888 persons.

MEDICAL NEWS

University of Cambridge

The title of the degree of M.D. has been conferred on Dr. Kathleen Muir.

University of London

At recent examinations the following candidates were successful:—

DIPLOMA IN PSYCHOLOGICAL MEDICINE

With Special Knowledge of Psychiatry.—Winifred M. Burbury, M.B., B.S., A. B. Carter, Bernard Cates, M. S. Jones, and W. G. Rees.

With Special Knowledge of Mental Deficiency.—R. M. Bates.

Part A.—R. W. Maxwell, Grace H. Thomson, W. P. Berrington, Neil McDiarmid, W. E. McIlroy, and David Prentice.

At recent examinations at the London School of Hygiene and Tropical Medicine the following candidates were successful:—

D.P.H.

Part I.—O. M. T. Ansari, W. H. Crichton, F. R. Dennison, H. A. Dirckze, Margaret L. Foxwell, Muriel O. Gibson, G. S. C. de S. Gunesekera, Ellen G. Heycock, F. E. Lipscomb, F. J. G. Lishman, G. H. Lowe, G. P. McC. Marshall, K. J. G. Milne, D. D. Payne, Ethel A. Perrott, C. D. Preston, Alison J. Rae, Llywelyn Roberts, L. B. E. Seneviratne, Mary Sutcliffe, L. G. W. Urich, and S. L. Wright.

Three lectures on experimental vertebrate embryology will be given at University College, Gower-street, W.C., at 5.15 P.M. on May 22nd, 24th, and 25th by Prof. W. Vogt of Zurich. Prof. J. P. Hill, F.R.S., will take the chair at the first lecture. Admission will be without ticket.

Geoffrey Duveen Travelling Studentship.—Applications are invited from medical graduates of the University for this studentship. It is of the value of £450 per annum, and it will be awarded to a research worker in oto-rhino-laryngology. Applications should reach the academic registrar of the University, South Kensington, S.W.7, before June 11th.

Research Funds.—Applications are invited for grants from the Thomas Smythe Hughes and Beaverbrook medical research funds, which are allocated for the support of original medical research. Grants may also be made from the Dixon fund for assisting scientific investigations. The latest date for application is May 15th, and particulars may be had from the academic registrar.

Royal Institute of Public Health

The final programme of the annual congress, to be held in Norwich from Tuesday, May 15th, to Whit-Sunday, the 20th, has now been issued. Application for membership should be made to the hon. secretaries of the institute, 23, Queen-square, London, W.C.1.

Society of Apothecaries of London

At recent examinations the following candidates were successful:—

Surgery.—A. E. Ginn, Guy's Hosp.; G. W. Hardy, St. Mary's Hosp.; R. G. Joyce, St. Bartholomew's Hosp.; H. Murkus, Univ. of Birmingham; D. Rocyn-Jones, Welsh National School of Medicine.

Medicine.—S. Grodd, St. Mary's Hosp.; H. G. Howitt, London Hosp.; L. A. Lewis, King's College Hosp.; T. Morgan, Guy's Hosp.; F. D. Paterson and J. H. Playne, St. Mary's Hosp.; P. H. Willcox, Univ. of Cambridge and St. Mary's Hosp.

Forensic Medicine.—P. T. M. Clarke, Middlesex Hosp.; S. Grodd, St. Mary's Hosp.; B. S. Minden, St. George's Hosp.; J. R. Owen, Univ. of Cambridge and St. Mary's Hosp.; F. D. Paterson, St. Mary's Hosp.

Midwifery.—J. A. Carter, Univ. of Cambridge and London Hosp.; S. Klein, Univ. of Vienna and St. Mary's Hosp.; J. E. T. Munn, St. Mary's Hosp.; C. W. O'Donoghue, London Hosp.; F. D. Paterson, St. Mary's Hosp.; D. Walton, Univ. of Manchester; J. P. Walsh Conway, Charing Cross Hosp.

The following candidates, having completed the final examination, are granted the diploma of the society entitling them to practise medicine, surgery, and midwifery: S. Grodd, T. Morgan, F. D. Paterson, J. H. Playne, J. P. Walsh Conway, and P. H. Willcox.

University of Glasgow

On April 21st the following degrees were conferred:—

M.D.—I. M. Christie and Harold Fairbairn (with high commendation); James Flind, S. I. A. Laidlaw, and Peter Shannon (with commendation); Alexander Duff, G. G. Macphee, N. McE. Montgomery, Archibald Ogg, Thomas Paton, H. S. Russell, A. G. Smith, Jean W. Symington, and R. N. Walker.

M.B., Ch.B.—E. W. Walls (with honours); Adam Muir (with commendation); J. M. Anderson, C. Arak, A. Cameron, D. Campbell, J. Campbell, W. Clark, J. M. Cook, R. G. H. Cunningham, Elizabeth M. Deighton, J. C. Fitch, C. M. Fraser, W. Gibson, J. Gilmour, W. Guthrie, Jean A. Holburn, A. S. Hutcheson, A. B. Kabnick, J. Kelly, S. M. Laird, C. M. Lamont, Jean H. M. Laurie, Magdalene Linton, S. Loman, A. M. McArthur, A. D. MacArthur, K. MacColl, Jeanie J. Macdonald, Maud P. MacDougall, S. W. MacDougall, D. Macfarlane, P. A. M. Macgregor, J. Mackenzie, M. J. McLaughlin, W. B. McLean, J. McPheat, T. J. R. Miller, N. Morison, W. W. Muir, J. Murray, S. S. Naftalin, J. S. Norwell, G. A. F. Quinnell, H. J. Reid, Jessie V. M. Robb, W. Rodger, R. L. Roxburgh, J. B. Shiel, E. I. Smith, Margaret B. Steel, J. N. R. Stephen, J. W. Strachan, J. C. Taylor, R. B. Taylor, Kathleen M. Warren, H. Weir, G. Wotherspoon, D. D. Young, and B. Zahb.

Queen's University Club, London

The annual spring dinner of this club will be held at the Dorchester Hotel, W., on Thursday, May 3rd, at 7.30 P.M., with Prof. R. M. Henry in the chair. Members may obtain tickets from the hon. secretaries at 101, Harley-street, W.1.

A Department of Industrial Medicine

The University of Birmingham has decided to institute a department of industrial hygiene and medicine, and arrangements are being made for its opening next October. The function of the department will be to undertake research in the application of medicine to industry, and to offer a special training to doctors who are whole- or part-time medical officers to industrial organisations or who wish to qualify for such posts. It is felt that Birmingham will be an ideal centre for such work, and the university will probably arrange to grant a diploma to those who complete the course of training successfully.

Dental Travelling Scholarship

Guy's Hospital dental school offers a travelling scholarship worth £250 to enable the holder to take out a course of at least six months' practical work in dental surgery at one or more colonial or foreign dental schools. Particulars were given in our advertisement columns last week (April 21st). Applications should be sent to the dean, Guy's Hospital dental school, London, S.E.1, not later than May 24th.

West End Hospital for Nervous Diseases

The Savill prize is offered biennially to a post-graduate student for a thesis on a neurological subject. Candidates must have attended the practice of the hospital, and must submit the subject of their choice to the examiners before May 31st. The thesis must be received by Nov. 30th. The value of the prize is £15, and communications should be addressed to the secretary of the hospital, Welbeck-street, London, W.1.

Hospital for Sick Children

A post-graduate course on diseases of children will be held at this hospital from April 30th to May 12th. Particulars will be given weekly in our Medical Diary. Applications should be addressed to the secretary of the hospital, Great Ormond-street, London, W.C.1.

Clinical assistants.—There are a few vacancies at the hospital for clinical assistants to the physicians to out-patients. Practitioners registered in Great Britain who are willing to give their services for a few hours on one or two mornings each week should communicate with the secretary of the hospital.

Light and Heat Exhibition and Conference

In connexion with the Hospital Equipment Exhibition and Conference which will be held this year at Grosvenor House, London, W., there will be a section devoted to light, heat, and massage in relation to medicine and surgery. The exhibition will be opened on April 30th, at 2 P.M., by Princess Marie Louise, and later in the same day papers will be read by Dr. William Brown, on the healing touch (2.30 P.M.), and Sir W. Arbuthnot Lane, on diet and race (6.30 P.M.). Speakers on subsequent days will be Mr. J. D. Magor Cardell (May 1st), Sir Kenneth Goadby, Mr. Cecil Voge, Ph.D., and Mrs. Marie Stopes, D.Sc. (May 2nd), Dr. J. Russell Reynolds and Mr. G. W. C. Kaye, D.Sc. (May 3rd), and Dr. C. W. Buckley and Dr. F. Howard Humphris (May 4th).

Royal Sanitary Institute

Sir Hilton Young, the Minister of Health, will address a special session of the health congress of this institute, which is to be held at Bristol from July 9th to 14th. The title of his address will be Some Aspects of the Housing Question. It is expected that 1400 persons will be present at the congress, and an elaborate programme has been prepared. In the health exhibition connected with the meeting will be found appliances, foods, and other exhibits illustrating municipal activities and the hygiene of the home. Particulars may be had from the secretary of the institute, 90, Buckingham Palace-road, London, S.W.1.

As a memorial to the late Prof. A. Bostock Hill, M.D., the council has decided to offer for annual award a challenge shield for the best celebration of Health Week in the Empire, outside the British Isles. Health Week this year will be from Oct. 7th to 13th, and overseas centres wishing to enter the competition must submit reports by Dec. 31st.

Royal Eye Hospital

This hospital in St. George's Circus, Southwark, closed 1933 with a credit balance of £1236. There were increases in annual subscriptions and donations, but they are still inadequate. The report emphasises the need for a rebuilding scheme estimated to cost £150,000. It is intended shortly to issue a public appeal.

Medical Diary

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

TUESDAY, May 1st.

Orthopædics. 5.30 P.M. Annual General Meeting. Cases at 4.30 P.M.

Special Meeting of Fellows. 8 P.M. Demonstration by Dr. Russell Reynolds on X-ray Cinematography. Dr. Robert Janker (Bonn) will also show films. Admission by ticket only.

WEDNESDAY.

History of Medicine. 5 P.M. Annual General Meeting. Dr. Herbert R. Spencer: The History of Ovariotomy.

Surgery. No meeting of the Section on this day.

THURSDAY.

Tropical Diseases and Parasitology. 8 P.M. Special Meeting to consider regulations of the section. 8.15 P.M. Annual General Meeting. Dr. H. S. Stannus: The Hyperostoses of the Face and Cranium (Epidiascope).

FRIDAY.

Otology. 10 A.M. Annual General Meeting. Cases at 9.30 A.M. Dr. Albert A. Gray: The Otosclerosis Problem (Dalby lecture). Demonstration: Valve Amplifier Hearing Aids (Audiograph).

Laryngology. 5 P.M. Annual General Meeting. Cases at 4 P.M.

Anæsthetics. 8.15 P.M. Annual General Meeting. 8.30 P.M. Dr. R. J. Minnitt: Self-administered Analgesia for the Midwifery of General Practice (illustrated by film).

Obstetrics and Gynæcology. Members of this Section invited.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY.

FRIDAY, May 4th.—8.30 P.M. (at the West London Hospital). Mr. A. Tudor Edwards: Malignant Disease in the Chest.

BIOCHEMICAL SOCIETY.

SATURDAY, May 5th.—2.30 P.M. (in the Department of Biochemistry, Oxford). Communications and Demonstrations.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East, S.W. TUESDAY, May 1st, and following Thursday.—5 P.M., Dr. C. H. Andrewes: Viruses in Relation to the Ætiology of Tumours (Oliver-Sharpey lectures).

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, London, W.

MONDAY, April 30th, to SUNDAY, May 6th.—MAUDSLEY HOSPITAL, Denmark-hill, S.E.5. Course in Psychological Medicine. Afternoons.—ST. JOHN'S HOSPITAL, Leicester-square, W.C. Course in Dermatology. Afternoons.—CITY OF LONDON HOSPITAL, Victoria-park, E. Course in Cardiology. All day, Sat. and Sun.—MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W. Dr. A. E. Clark-Kennedy: Lecture on Auricular Fibrillation, at 2.30 P.M., on Tues. Thurs., at 4 P.M. The Skin in Relation to Rheumatism in Childhood and After Puberty, read by Dr. F. Fraser-Harris on behalf of the late Dr. Ll. J. Llewellyn.—PANEL OF TEACHERS. Individual clinics in various branches of medicine and surgery are available daily by arrangement with the Fellowship of Medicine. Courses of instruction, clinics, &c., arranged by the Fellowship of Medicine are open only to Members and Associates.

ST. PAUL'S HOSPITAL, Endell-street, W.C.

WEDNESDAY, May 2nd.—4.30 P.M., Mr. Kenneth Walker: Functional Disorders of the Genito-Urinary System.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.

MONDAY, April 30th. to SATURDAY, May 5th.—Third Week of Intensive Course in Laryngology, Rhinology, and Otology.

ROYAL NORTHERN HOSPITAL, Holloway-road, N.

WEDNESDAY, May 2nd.—3.15 P.M. (at the Royal Chest Hospital, City-road), Dr. Peter Kerley: Radiology of the Cardiovascular System.

THURSDAY.—3.15 P.M., Dr. E. G. B. Calvert: Functional Disorders of the Gastro-intestinal Tract.

KING'S COLLEGE HOSPITAL MEDICAL SCHOOL, Denmark-hill, S.E.

THURSDAY, May 3rd.—4.30 P.M., Colonel L. W. Harrison: Prevention of Venereal Disease.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.

(First of 2 Weeks' Course.)

MONDAY, April 30th.—10 A.M., Dr. Hutchison: Ward Visit. 11 A.M., Mr. Lloyd: Tuberculosis of Bones and Joints. 12 noon, Dr. Sheldon: Pulmonary Tuberculosis. 2 P.M., Dr. Thursfield: Ward Visit. 3 P.M., Dr. Nabarro: Immunisation against Diphtheria, Measles, and Scarlet Fever.

TUESDAY, May 1st.—10 A.M., Dr. Shires: Diseases of the Bones. 11 A.M., Dr. Cockayne: Ward Visit. 12 noon, Dr. Pearson: The Breast-fed Infant. 2 P.M., Dr. Frew: Ward Visit. 3 P.M., Dr. Payne: Diabetic Coma.

WEDNESDAY.—10 A.M., Dr. Gray: Diseases of the Skin. 11 A.M., Dr. Paterson: Treatment of Pneumonia. 12 noon, Mr. Addison: Ward Visit. 2 P.M., Dr. Hawksley: Diagnostic Use of the Blood Count. 3 P.M., Dr. Signy: Treatment of Septicæmia.

THURSDAY.—10 A.M., Dr. Wyllie: Cerebral Paralysis. 11 A.M., Mr. Tyrrell-Gray: Ward Visit. 12 noon, Dr. Sheldon: Rickets. 2 P.M., Dr. Thursfield: Ward Visit. 3 P.M., Mr. Crooks: Nasal Catarrh and Sinusitis.

FRIDAY.—10 A.M., Dr. Cockayne: Ward Visit. 11 A.M., Mr. Barrington-Ward: Ward Visit. 12 noon, Dr. Pearson: The Bottle-fed Infant. 2 P.M., Dr. Frew: Ward Visit. 3 P.M., Dr. Bruce Pearson: Treatment in Hay-fever and Asthma.

SATURDAY.—10 A.M., Dr. Paterson: The Anæmic Child. 11 A.M., Mr. Penman: Inflammatory Conditions of the Eye. 12 noon, Mr. Browne: Ward Visit.

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE, Hammersmith, W.

DAILY.—2 P.M. Operations, Medical and Surgical Clinics.

MONDAY, April 30th.—10 A.M., Skin Clinic, Medical Wards. 11 A.M., Surgical Wards. 2 P.M., Gynæcological and Surgical Wards, Eye and Gynæcological Clinics.

TUESDAY, May 1st.—10 A.M., Medical Wards. 11 A.M., Surgical Wards. 2 P.M., Throat Clinic. 4.15 P.M., Lecture, Mr. Green-Armytage: Uterine Inertia and Uterine Spasm.

WEDNESDAY.—10 A.M., Medical Wards, Children's Ward and Clinic. 2 P.M., Eye Clinic.

THURSDAY.—10 A.M., Neurological and Gynæcological Clinics. 11.30 A.M., Fracture Clinic. 2 P.M., Eye and Genito-urinary Clinics.

FRIDAY.—10 A.M., Skin Clinic. 12 noon, Lecture on Treatment. 2 P.M., Throat Clinic. 4.15 P.M., Lecture, Dr. Konstam: Microcytic Anæmia.

SATURDAY.—10 A.M., Medical and Surgical Wards, Children's and Surgical Clinics.

The Lectures at 4.15 P.M. are open to all medical practitioners without fee.

ST. MARY'S HOSPITAL INSTITUTE OF PATHOLOGY AND RESEARCH, Paddington, W.

THURSDAY, May 3rd.—5 P.M., Sir Bernard Spilsbury: Applications of Physiological Principles to Medico-Legal Problems.

LONDON SCHOOL OF DERMATOLOGY, St. John's Hospital, 49, Leicester-square, W.C.

TUESDAY, May 1st.—5 P.M., Dr. H. W. Barber: Alopecia Areata and Vitiligo.

WEDNESDAY.—5 P.M., Dr. H. Corsi: Diseases of the Nails.

THURSDAY.—5 P.M., Dr. S. E. Dore: Lantern or Epidiascope [illegible] Skin Diseases.

FRIDAY.—[illegible]: Skin Diseases due to Prot[illegible]

MANCHESTE[illegible]

TUESDAY, [illegible] B. Leech: Colitis.

FRIDAY.—[illegible]: Demonstration of Neuro-surgical Cases.

UNIVERSITY OF BIRMINGHAM.

TUESDAY, May 1st.—3.30 to 5 P.M. (at the General Hospital), Dr. E. W. [illegible]ment of Prostatitis. [illegible] Cases.

WEDNESDAY.—4 [illegible] of the Medical Fac[illegible] Adrian: The Activity of Nerve-cells. (Last of two Lectures.)

THURSDAY.—4 P.M., Dame Louise McIlroy: The Toxæmias of Pregnancy. (Last of two Ingleby Lectures.)

FRIDAY.—3.30 to 5 P.M. (at the Queen's Hospital), Prof. Bertram Lloyd: Surgical Cases.

LEEDS GENERAL INFIRMARY.

TUESDAY, May 1st.—3.30 P.M., Prof. A. M. Claye: Demonstration in Gynæcological Cases.

GLASGOW POST-GRADUATE LECTURES.

WEDNESDAY, May 2nd.—4.15 P.M. (at the Royal Hospital for Sick Children), Dr. S. Graham: Medical Cases.

Appointments

BAILEY, K. V., M.D. Manch., M.R.C.P. Lond., M.C.O.G., has been appointed honorary gynæcologist to the Stockport Infirmary.

BEAUMONT, E. V., M.B., B.S. Lond., Certifying Surgeon under the Factory and Workshop Acts for the Brandon District of the County of Suffolk.

KLETZ, NORMAN., [illegible] M.R.C.P. Lond., honorary assistant physic[illegible] Royal Infirmary.

STARKEY, J. W., M.[illegible] l., Medical Officer of Health, Colne, Lancs.

SUTHERLAND, DONALD MCKAY, M.D. Manch., F.R.C.S. Eng., honorary assistant surgeon to the Manchester Royal Infirmary.

Vacancies

For further information refer to the advertisement columns

Aberdeen Royc' [illegible]

Ashton-under-[illegible] £300.

Birmingham, [illegible]

Birmingham, Yardley Green-road Sanatorium.—Jun. M.O. At rate of £200.

Birmingham, Selly Oak Hospital.—Cas. O. At rate of £200.

Birmingham University.—Lecturer in Bacteriology. £400.

Bolingbroke Hospital, Wandsworth Common, S.W.—H.S. At rate of £120.

Bridgend, Glamorgan County Mental Hospital.—Jun. Asst. M.O. £350.

Cambridge, Addenbrooke's Hospital.—H.P. At rate of £130.

Cancer Hospital, Fulham-road, S.W.—Laryngologist.

Central London, Throat, Nose, and Ear Hospital, Gray's Inn road, W.C.—3rd Res. H.S. At rate of £75. Also Hon. Assts. in the Out-patient Dept.

Chichester, Royal West Sussex Hospital.—Sen. and Jun. H.S. £175 and £125 respectively.

Coventry and Warwickshire Hospital.—H.S. (Male). Also Cas. O. (Male). Both at the rate of £125.

French Hospital and Dispensary, 172, *Shaftesbury-avenue, W.C.*—Hon. Dermatologist.

Harrow U.D.C.—M.O.H. £1000.

Hospital for Sick Children, Great Ormond-street, W.C.—Physician to Out-patients. Also Surgeon; and Clin. Assts. to Physicians to Out-patients.

Ilford, King George Hospital.—Deputy Res. M.O. £200. Also H.S. At rate of £100.

Liverpool Port Sanitary Authority.—Asst. Port M.O. £700.

London County Council.—Asst. M.O. £600.

London Homœopathic Hospital, Great Ormond-street, W.C.—Res. M.O. £100.

London Hospital, E.—Hon. Clin. Asst. to Radiological Dept.

London Jewish Hospital, Stepney Green, E.—Res. M.O. and H.P. Also Cas. O. Each at rate of £150. And H.S. At rate of £100.

London University.—University Chair of Pharmacology. £1000.

Manchester Northern Hospital for Women and Children.—Sen. H.S. £130.

Manchester Royal Eye Hospital.—Jun. H.S. £120.

Manchester Royal Infirmary.—Sen. Asst. M.O. for Radiological Dept. £400.

Manchester, Withington Hospital and Institution.—Asst. M.O. £350.

Market Drayton, Cheshire Joint Sanatorium.—H.P. £250.

Merthyr Tydfil County Borough.—Asst. M.O.H. and Asst. School M.O. £500.

Middlesex County Council.—Dist. M.O.'s and Public Vaccinators. Each £50.

National Temperance Hospital, Hampstead-road, N.W.—Hon. Asst. Dental Surgeon.

North-West District Child Guidance Clinic, 18, *Belsize-crescent, N.W.*—Director. £300.

Norwich, City of Norwich Mental Hospital, Hellesdon.—Res. Locum Tenens M.O. At rate of £150.

Paddington Green Children's Hospital, W.—Hon. Surg. to Ear, Nose and Throat Dept.

Port of London Sanitary Authority.—Boarding M.O. £500.

Princess Beatrice Hospital, Earl's Court, S.W.—Hon. Clin. Assts. and Hon. Anæsthetist.

Queen Charlotte's Maternity Hospital, Marylebone-road, N.W.—Asst. Res. M.O. At rate of £80. Also two Res. Anæsthetists. Each at rate of £100.

Queen's Hospital for Children, Hackney-road, E.—Surgeon to Ear, Nose and Throat Dept.

Royal Free Hospital, Gray's Inn-road, W.C.—Sen. Res. M.O. £150.

Royal London Ophthalmic Hospital, City-road, E.C.—Out-patient Officer. £100.

Royal Waterloo Hospital for Children and Women, Waterloo-road, S.E.—H.P. At rate of £100.

St. Albans and Mid-Herts Hospital and Dispensary.—Res. H.S. £150.

St. Mary Abbots Hospital, Marloes-road, Kensington, W.—Asst. M.O. £350.

St. Mary Islington Hospital, Highgate Hill, N.—Asst. M.O. £250.

St. Stephen's Hospital, 369, *Fulham-road, S.W.*—Asst. M.O. £250. Also Clin. Asst. At rate of £100.

Salford City Education Committee.—Asst. School M.O. £520.

Sheffield Royal Hospital.—Res. Ophth. H.S. £120. Also Res. Asst. Cas. O. At rate of £80.

Shoreditch Metropolitan Borough.—M.O.H. £1000.

Southampton Children's Hospital and Dispensary for Women.—Hon. Anæsthetist.

Southend Municipal Hospital.—Sen. Asst. M.O. £350.

Southend-on-Sea, Infectious Diseases Hospital.—Asst. M.O. £600.

Stoke-on-Trent, North Staffordshire Royal Infirmary.—Orthopædic H.S. £150.

Sunderland Royal Infirmary.—H.S. £200.

Swanley, Kent, White Oak Hospital.—Res. M.O. At rate of £200.

Swansea County Borough.—Asst. M.O. £500.

West London Hospital, Hammersmith-road, W.—Hon. Dermatologist. Also Hon. Asst. Anæsthetist.

Westminster Hospital, Broad-sanctuary, S.W.—H.S. to Spec. Depts. At rate of £104.

Will Edmonds' Clinical Research Fund.—Fellowship. £500.

Winchester, Royal Hampshire County Hospital.—Res. Surg. O. At rate of £200.

Windsor, King Edward VII. Hospital.—Hon. Asst. Surgeon.

Wolverhampton and Midland Counties Eye Infirmary.—H.S. £150.

Wolverhampton, Royal Hospital.—H.S. At rate of £100.

NOTES, COMMENTS, AND ABSTRACTS

BUDGET RELIEF ON SMALL INCOMES

Mr. W. T. Fry, income-tax consultant (13, Buckingham Palace-gardens, London, S.W.1), writes: "Although the Budget gave some measure of relief to income-tax payers the man with a small income is still overburdened. It is to be hoped that next year the Chancellor will be able to restore the abatements which were in force prior to the emergency Budget of 1931. Some idea of the position is given by the following figures, which show the tax payable on an earned income of £650 by a man with family responsibilities:—

	1933–34. £ s. d.	1934–35. £ s. d.	1930–31. £ s. d.
Single man with widowed mother to support	76 17 6	69 3 9	54 12 6
Married man	70 12 6	63 11 3	40 0 0
Do. with 1 child	58 2 6	52 6 3	26 10 0
Do. with 3 children	38 2 6	34 6 3	15 13 4

From the above examples it will be seen that the relief given by the Budget is very small, and for this reason it is essential that the return forms which are now being issued should be completed with the greatest care and all possible abatements claimed."

A SEVERE WINTER FOR ANIMALS IN CAPTIVITY

THE Zoological Society's country home at Whipsnade has been showing increasingly the extent to which non-native animals can live an open-air life in this country, but the spell of cold weather at the beginning of last winter was a trying time both there and in Regent's Park. At Whipsnade the chief losses were four alligators, two nylghaie, four Canadian beavers, two axis deer, a tiger, a bison, a sloth bear, a sarus crane, and an ostrich. The report does not state whether all these animals succumbed to the cold, and indeed the experiment of keeping monkeys at Whipsnade during the winter was highly successful. A colony of 25 rhesus monkeys, provided with sheltering barrels in an enclosure around a tall oak tree in Wallaby wood, kept in extremely good health all the winter, although they killed the tree by eating all the young shoots. Moreover the two young chimpanzees who had spent the summer at Whipsnade, in a caravan provided with electric heating, stayed out the winter there and seemed to enjoy the opportunity of sun and open-air exercise even in the cold weather. In Regent's Park the cold snap and the foggy weather which preceded it played havoc in the outdoor aviaries and carried off two birds, a white crane and a cinereous vulture, both of which had been over 32 years in the collection. There was indeed a sharp rise in the incidence of respiratory disease among all classes of animals during this period, although it is gratifying to see how low has become the mortality from tuberculosis. Last year it was only 3·9 per cent. among mammals in spite of a small outbreak among coatis. The highest monkeys have kept quite free. Taken all round, the annual death-rate among acclimatised animals is only 19 per cent. for mammals and 23 per cent. for birds, among a total population of 725 and 1479 respectively.

TUBERCULOSIS AND CANCER

Two years ago Dr. Thomas Cherry, of Melbourne, read a paper[1] at the centenary meeting of the B.M.A. describing some experiments he had made in mice, which suggested that the inoculation of small doses of virulent tubercle bacilli favoured the development of tumours and intestinal ulcers. These results threw light, he thought, on the way in which the increasing death-rates from cancer approximately balance the reduction of the rates from tuberculosis. In a recent paper[2] he shows that the causes of death of the mean population aged 15–25 enumerated in England at the four census periods 1841, 1851, 1861, and 1871 are now complete to old age and those of 1881 to the age of 65. In each of the four complete sections of the population, by simply adding the deaths from phthisis and cancer and dividing the sum by the number of deaths from all causes, there is obtained an almost uniform percentage, and at the age of 65 a corresponding uniformity is found in the five series. After deducting deaths from accident from the total deaths the percentages are: for 1841 series 21·70, for 1851 series 22·16, for 1861 series 22·8, and for 1871 series 22·22. It is difficult to believe, he thinks, that these practical identities are due to coincidence. At the recent Australasian Medical Congress, held at Hobart, Dr. Cherry discussed the reliability of the earlier certificates of death. In the material he used, the deaths from cancer do not become important before 1880, because the age-groups from 15 to 45, which contribute most of the deaths from phthisis, yield only a small proportion of those due to cancer. The actual figures up to 1880 include 16,000 deaths from cancer in men and 49,000 in women. The probable error in the female deaths Dr. Cherry regards much less than in the case of males because in women a far larger proportion of cancer occurs in accessible sites.

BRONCHOSPASM AND ASTHMA

WE have received a pamphlet on this subject from the British Felsol Co., Ltd., 15, Caroline-street, London, W.C., written to bring before the medical profession the value of Felsol in the treatment of asthmatic subjects. The composition of felsol powders (already given in THE LANCET, 1928, i., 534) is as follows:—

Phenyl-dimethyl-isopyrazolone	0·47
Phenyl-dimethyl-iodopyrazolone	0·03
Anilipyrine β	0·40
Caffeine	0·10
Ext. Visci. Alb.	0·01
Ext. Brachycladii	0·01

The powders can be prescribed by the medical man in accordance with the definite régime which he decides to adopt in the treatment of a case, the claim for felsol being that its administration relieves promptly the attack of asthma by its influence over bronchial spasm, so that only the most severe cases would require the injection of morphia.

A NOISE-EXCLUDING WINDOW

ON April 19th and 20th, by invitation of the Editor of the *Parthenon*, demonstrations were given at 43, Grosvenor-place, London, of a method of noise elimination, by which, without interference with ventilation, rooms may be made sound-proof. A specially fitted room was placed at the disposal of the inventor of a patent window by the Council of the Incorporated Association of Architects and Surveyors, the window being the design of Mr. E. T. Fisk, managing director of Amalgamated Wireless of Australia Ltd. Of louvre pattern, the panes of glass open outward, while inside the room each pane is covered by a sound-absorbing blind which can be adjusted as to the height and the angle of inclination. The intention was that the sound of outdoor traffic should ascend through the openings of the window panes and be partly absorbed and partly deflected back by the blinds. The room in which the demonstrations took place was constructed with "pioneer" partitions and a shipwright floor, both patent devices intended to isolate it from noise which might emanate from adjacent apartments; but the window was exposed to the roar of the traffic in Grosvenor-place. The noise was pronounced when the sound-absorbing blinds were drawn up, and when the door of the experimental room, which opened on a balcony, was unclosed. When the door was shut and the blinds were adjusted the sound died down to an almost unnoticeable murmur. The blinds obstruct light to some extent, but sufficient is admitted for most purposes, and as regards ventilation, the window, when open, is claimed to be as effective for keeping out noise as an ordinary window when closed. The Fisk window, when closed, seems to be more sound-proof than ordinary windows. The window can be left open in driving rain without water entering the room, and the amount of dust entering the apartment from outside in dry weather is appreciably reduced by its construction. The invention is also useful as a sunshade, and ventilation is under full control. Easy fitting and low cost are other advantages claimed which should be of attraction to business firms and offices, and hospitals might particularly benefit by the adoption of the Fisk window.

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[1] THE LANCET, 1932, ii., 518.

[2] Med. Jour. Australia, August 12th, 1933, p. 197

A METHOD OF APPLYING TANNIC ACID TO BURNS

Dr. ARTHUR H. BENNETT (Northwich) writes: "It may be of some interest to readers to hear of a very simple method which I use to apply tannic acid to burns. Messrs. Woolley and Sons, of Manchester, have prepared for me surgical lint impregnated with tannic acid and mercuric chloride in such proportions that, when the lint is thoroughly saturated with water, it contains a 2 per cent. solution of tannic acid and 1/2000 solution of mercuric chloride. This affords a simple and convenient means of applying tannic acid to a burn, as suggested by Mr. Mitchiner, both as a first aid and as a permanent dressing. I have successfully used this method in a number of cases and the results have compared very favourably with those of others treated with fresh solution made from tablets."

A PAINLESS DRESSING FOR BURNS

Dr. E. S. Dukes (Mangonui, N.Z.) writes: The present treatment of burns is anything but satisfactory; we must all have witnessed the agony of patients during the changing of a dressing, and we know how often an anæsthetic has to be given, or a prolonged soaking, before the change can be effected. All this can be avoided by a dressing of boric-acid ointment spread upon thin rubber cloth. This never sticks, there is next to no discharge, and its removal is so painless that a child need not be awakened. The waterproof is scalded before use, and the same piece can be used again after rinsing and scalding. The wounded surface need not be washed, a new dressing being applied immediately the old is removed.

A NOTEWORTHY GOLDEN WEDDING

Mr. J. Lionel Stretton, J.P., L.R.C.P. Lond., M.R.C.S., and his wife celebrated their golden wedding on Saturday, April 21st. Mr. Stretton was present at the golden wedding celebrations of his grandfather, Mr. William Weston Stretton, J.P., and of his own father, Mr. Samuel Stretton, J.P., whom he succeeded in practice. On Saturday last Mr. and Mrs. Stretton were joined by their three children with their families. At the annual meeting of the Kidderminster and District General Hospital, of which Mr. Stretton is consulting surgeon and president, he received last year a jubilee presentation on the occasion of his completing 50 years as a member of the honorary medical staff, and in recognition of long, devoted, and valuable services. Mr. Stretton's organising abilities resulted in valuable extensions to the hospital which were opened by the Duke of York in 1926. Last December Mr. Stretton was honoured by his own profession from all parts of Worcestershire with a dinner in celebration of his 21st year as chairman of the County of Worcester Local Medical and Panel Committee, when representatives of the Ministry of Health were present. On that occasion, paying a tribute to his wife, he said, "I have the comfort of a good wife, who has helped me in my duties for the hospital, and I feel it only right that on this occasion I should refer to them." We congratulate Mr. and Mrs. Stretton in the name of the medical profession upon having followed the example of two preceding generations by celebrating a golden wedding.

THE SERVICES

ARMY MEDICAL SERVICE

Maj.-Gen. H. C. R. Hime, K.H.P., late R.A.M.C., retires on retd. pay.

Col. O. Ievers, late R.A.M.C., to be Maj.-Gen.

Lt.-Col. P. Power, from R.A.M.C., to be Col.

ROYAL ARMY MEDICAL CORPS

Maj. & Bt. Lt.-Col. M. J. Williamson to be Lt.-Col.

TERRITORIAL ARMY

Lt.-Col. W. McK. H. McCullagh, late R.A.M.C., Mila., to be Maj., and relinquishes the rank of Lt.-Col.

Capt. W. H. Gratrix resigns his commn.

Capt. F. C. Lewis relinquishes his commn. and retains his rank.

Lt. R. H. Mortis to be Capt.

Lt. G. A. F. Holloway resigns his commn.

R. W. Hendry to be Lt.

TERRITORIAL ARMY RESERVE OF OFFICERS

Maj. J. D. Fiddes having attained the age limit retires and retains his rank, with permission to wear the prescribed uniform.

Capt. G. Eager having attained the age limit retires and retains his rank, with permission to wear the prescribed uniform.

Capt. D. G. Coutts, from Active List, to be Capt.

Lt. J. Simpson, from Active List, to be Lt.

INDIAN MEDICAL SERVICE

Lts. E. H. Lossing and M. Sendak to be Capts. (provl.).

Rattan Kumar Misra and Amar Nath Duggal to be Capts. (on prob.).

Capt. B. K. Silkand resigns his temp. commn.

ROYAL AIR FORCE

Flight Lt. R. L. C. Fisher is promoted to the rank of Squadron Leader.

Births, Marriages, and Deaths

BIRTHS

NOTLEY.—On April 15th, at 105, Rockingham-road, Kettering, the wife of Dr. J. W. Notley, of a son.

RICHARDSON.—On April 20th, at 112, Highfield-lane, Southampton, the wife of L. Aylwin Richardson, F.R.C.S., of a daughter.

MARRIAGES

KENNEDY—DALES.—On April 14th, at The Priory Church, St. Bartholomew-the-Great, Smithfield, John Kennedy, F.R.C.S.I., to Sheila Freeman, only daughter of the late John Freeman Dales and Mrs. Dales, of Pentre Derwen, Oswestry.

DEATHS

CARR-CALTHROP.—On April 17th, at Croyland, Grange-road, Ealing, Middlesex, Colonel Christopher William Carr-Calthrop, C.B.E., I.M.S., J.P., aged 8[illegible] years.

LLEWELLYN.—On April 19th, Richard Ll. [illegible] Llewellyn, M.B. Lond.

LLEWELLYN.—On April 20th, at 13, Westbourne-road, Penarth, Glamorgan, Thomas Richard Llewellyn, [illegible].R.C.S., L.R.C.[illegible]., Regional M.O., South Wales, aged 64.

SPENCE.—On April 20th, at 18, Upton-road, Watford, [illegible]ry Spence, M.B. Ch.B., aged 63.

WATSON.—On April 20th, at University College Hospital, James Watson, L.R.C.P., L.R.C.S., L.D.S.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

ARC LAMP CARBONS.—Messrs. Watson and Sons (Electro-Medical), Ltd., write: "An increased import duty on arc lamp carbons was imposed by the recent Budget, which will affect the prices of foreign-made medical carbons. It has been alleged that this will mean an additional burden on our hospitals, because they could not obtain British carbons equivalent to those manufactured abroad. We wish to emphatically state that British carbon manufacturers are in no way behind their foreign competitors in respect of either the quality or range of their products."

ADDRESSES AND ORIGINAL ARTICLES

THE HORMONES AND THEIR CHEMICAL RELATIONS*

BY E. C. DODDS, M.V.O., M.D., D.Sc., F.R.C.P. Lond.
COURTAULD PROFESSOR OF BIOCHEMISTRY IN THE UNIVERSITY OF LONDON; DIRECTOR OF THE COURTAULD INSTITUTE OF BIOCHEMISTRY AT THE MIDDLESEX HOSPITAL

LECTURE I

IN the year 1914 Simmonds of Hamburg described two cases of a disease which was ultimately to bear his name (Simmonds, 1914 and 1916). The typical history and post-mortem records may be taken from the work of Riecker and Curtis (1932).

One of the patients, a woman aged 41, complained of progressive weakness and loss of weight. There was no interesting point in either the family or personal history. The patient was married at the age of 20 and had one child, who was living and healthy at the time of consultation. Menstrual periods ceased at the age of 26, whilst at 30 she noticed a lack of sweating. About this time she became very anxious concerning her appearance, since she was obviously ageing very rapidly. The sense of weakness and weariness increased, and at the age of 36 the patient suffered what she termed a stroke, which left paralysis of the right side of the face together with deviation of the right eye. At the present time she suffered from a feeling of chilliness, weakness, poor appetite, and loss of memory. Altogether she had lost some 20 lb. On physical examination the skin was atrophic, dry, and cool. There were definite signs of syphilis, but the blood pressure and reflexes were normal. The basal metabolic rate was minus 28; hæmoglobin, 90 per cent.; and the urine was free from abnormality.

The post-mortem findings from a further series of cases quoted by Riecker and Curtis show in all cases destruction of the anterior lobe of the pituitary, either by tumour or inflammatory process, together with atrophic changes in the liver, pancreas, suprarenals, thyroid, and ovaries or testes. A detailed study of all the published cases shows that this is indeed a general syndrome commencing with a destruction of the anterior lobe of the pituitary followed by subsequent degeneration of the organs mentioned above.

My first task as Goulstonian lecturer is thus completed, in spirit if not literally; for Dr. Goulston in his bequest laid down that the lectures should be illustrated—

> "on some dead body if possibly it can be procured, which shall then and there be dissected for the disease treated of, and shall afterwards be buried."

Clinical study and gross morbid anatomy must be the starting point of all medical investigation, and it was clearly the wish of the founder of these lectures that the theories propounded in them should rest on this sound foundation. In Simmonds's disease we see incontrovertible evidence that destruction of the anterior lobe of the pituitary is attended with a slow degeneration of various organs, but more particularly of the gonads, the pancreas, suprarenal, and thyroid. Taking these fundamental observations as the basis of these lectures, it is proposed to push the dissection clearly wished for by Dr. Goulston to the very finest possible limits, and I hope to be able to show you that it is now possible to carry the dissection actually down to the stage of molecular structure. By this study we shall be able to visualise the type of key that the body manufactures to open and close its various locks; and I hope also to be able to show you that it is possible for the organic chemist to manufacture keys entirely of his own design with which he can open these natural locks. And from this research it is possible to prophesy that the organic chemist and the pharmacologist are entering an entirely new field of therapeutic research.

Functions of the Anterior Pituitary

It is difficult to arrive at the first historical connexion of the anterior lobe of the pituitary as a controlling factor in the whole of the body. One may divide the earlier experiments into firstly clinical observations, secondly a study of the effects of hypophysectomy, and thirdly the effect of the administration of extract of the anterior lobe.

That the pituitary gland as a whole was involved in certain general diseases has been known for many years. The first clinical observation was that of Marie (1888) in 1886, who succeeded in establishing a connexion between the disease acromegaly and the pituitary. He was under the impression that the disease was associated with hypofunction of the gland, but to-day the reverse is held to be true. The other great clinical step in establishing the relationship of the anterior lobe of the pituitary to other organs of the body has already been referred to—namely, the study of cases of Simmonds's disease.

Turning to the question of hypophysectomy, it was early demonstrated by Paulesco (1908) that the removal of the pituitary gland as a whole is followed by death in certain animals. This was confirmed later by Cushing and his collaborators (Reford and Cushing, 1909; Crowe, Cushing, and Homans, 1910). Cushing was also able to demonstrate that partial hypophysectomy resulted in an increase of subcutaneous fat and a cessation of sexual activity (Cushing, 1909). As the result of his researches Cushing and his co-workers were definitely able to refer the sexual control to the anterior lobe of the pituitary. The greatest advances in the subject, however, were made following the perfection of methods of hypophysectomy on small animals. The first experiments with rats were made by Smith (1927,[1] 1930) in 1927. These experiments indicated quite clearly that a condition of infantilism persists if the operation be performed before puberty, and if performed after puberty, cessation of the œstrus cycle together with atrophy of the ovaries resulted. There is now an extensive literature indicating the relationship between the anterior lobe of the pituitary and the sex organs as studied by this method.

The next step was made by a study of the effect of implants of the pituitary gland. In the year 1926 Zondek and Aschheim (1927) and independently Smith (1926 and 1927[2]) published the results of implants in animals. It was shown that the implantation of pituitary into a hypophysectomised animal induced growth of follicles together with corpus luteum formation. When implanted into immature normal females the ovaries became enlarged due to growth of follicles and the formation of corpora lutea; the uterus and vagina increase in size and œstrus appears. In immature male animals the results are not so striking, but with the continuation of grafts it is found that enlargement of the testes results, and, according to some, premature spermatogenesis occurs (Voss and Loewe, 1928). According to Moore and Price (1931), however, whilst they confirm the enlargement of the seminal vesicles and prostate, there is no evidence of premature spermatogenesis.

The final proof of the relationship of the anterior lobe of the pituitary to the sex and other organs is demonstrated by the preparation of the gonadotropic hormone from extracts of the anterior lobe of the pituitary. There appears to be little doubt that the first active extracts of the pituitary gland were obtained in Evans's laboratory in 1928 (Evans and Simpson, 1928, 1929). It was shown that these extracts were capable of inducing hypertrophy of the ovary and puberty in the immature female animal.

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* The Goulstonian lectures for 1934, delivered before the Royal College of Physicians of London on March 6th, 8th, and 13th. Lectures II. and III. will appear in forthcoming issues.

Having established the historical foundation for the doctrine of the pituitary control of the sexual cycle, it will suffice to proceed with the description of the hormones according to the state of our knowledge at the present moment, since any attempt at historical or chemical sequence would prove too lengthy.

The present-day view is that the anterior lobe of the pituitary produces the *following hormones*: (1) growth hormone; (2) prolan (A and B); (3) thyrotropic hormone; (4) pancreaticotropic hormone; (5) adrenotropic hormone; (6) parathyrotropic hormone.

With the growth hormone we are not concerned at the present time.

Prolan

Prolan is the first link between the pituitary gland and the sex organs. It passes in the blood stream to the ovary and testes and there initiates changes which are responsible for the secondary sexual characteristics. The stimulation of the testes by prolan results in the production of its own internal secretion, the male sex hormone.

THE MALE HORMONE

The study of the male sex hormone dates back very considerably, and it is indeed difficult to be certain who made the first definite experiments.

As early as 1849 Berthold (1849) succeeded in producing the familiar comb and wattles in a capon by the transplantation of testis tissue. This experimental demonstration of the stimulating action of prolan upon testis function is a striking confirmation of the experiments quoted earlier, in which it was shown that implants of the pituitary gland in immature animals produced similar activation. Perhaps the most familiar investigation is that of Brown-Séquard (1889), published in the year 1889. This much quoted research must, I fear, be regarded in the light of modern knowledge with much suspicion. It will be remembered that Brown-Séquard, then an old man, injected a simple extract of testes into himself and described very clearly a general feeling of well-being which one feels could only have been the result of suggestion. Judging from our clinical experience with other hormones, and particularly with the female sex hormone, even if Brown-Séquard's extract had contained any active testis hormone, the quantity present would have been so slight as to have no effect.

There can be little doubt that the first clear-cut experiments were made by Pézard (1911 and 1920) in the year 1911. He repeated the earlier work of Berthold and was one of the first to realise the great importance of the capon as a test object. It is a well-known fact that if the cockerel be completely caponised, the characteristic head furnishings atrophy and almost completely disappear. If a testis be grafted into such a bird, a successful operation is followed by fairly rapid growth of the comb, wattles, and the development of secondary sexual characteristics. Pézard injected intraperitoneally into his capons a preparation constituted of crushed hog cryptorchid testes for five months. The combs grew rapidly, and regressed as soon as the injections were stopped. It appears highly possible that some at least of Pézard's results were due to actual survival of the cells of hog testes, since attempts to repeat his experiments with extracts of testes in quantities similar to those he used have proved completely negative.

From 1911 onwards a series of doubtful experiments were made by a number of workers, but since we are only concerned here with the main landmarks, we must pass to the year 1927. McGee (1927) proved conclusively that an alcoholic extract of bulls' testes contained an active principle capable of causing growth in the comb. He showed that if the alcohol were evaporated off under reduced pressure, the lipins remaining were quite stable and could be injected either in aqueous suspension or in oily solution. These results were quickly confirmed by a number of workers including myself and my colleagues.

A long series of investigations were then made on the sensitivity of the comb-growth test. It is claimed by many workers that the results are quantitative, that is to say, if one injects double the quantity of hormone the comb will grow twice as long. This view has been severely attacked by Greenwood and myself, and we showed that the response is by no means quantitative, and that very large numbers of birds would have to be employed before an accurate assay could be obtained (Dodds, Greenwood, and Gallimore, 1930; Blyth, Dodds, and Gallimore, 1931).

The chemical study of the hormone could not progress to any great extent until a new source of the material other than testes could be obtained. The presence of the hormone in urine was discovered almost simultaneously and independently by a number of workers (Loewe, Voss, et al., 1928; Funk, Harrow, and Lejwa, 1930; Dodds, Greenwood, and Gallimore, 1930). All the workers quoted here investigated very carefully the chemical properties of their extracts. In my laboratory it was shown that the material could be obtained as an oil which was capable of vacuum distillation, and its properties were very similar to those of the œstrus-producing hormone. We were able to show that it would also resist saponification with alkalis such as barium hydroxide, and in addition to causing comb growth, we were able to show that the extract would produce great enlargement of the seminal vesicles as had been shown by workers with cruder extracts (Dodds, Greenwood, Allan, and Gallimore 1930).

The greatest advance in the chemistry of the compound was made by Butenandt (1931) who succeeded in obtaining a crystalline preparation by fractional distillation. He obtained a series of derivatives such as a diol and an oxyketone and he established with fair certainty that the molecule belonged to the same group as that of œstrin and the sterols. Since, however, this work *is so closely connected with that of œstrin*, I propose to leave this problem until we discuss the molecular construction of the female sex hormone (Butenandt, 1932–33).

PROLAN AND THE OVARY

To turn to the ovary, prolan passes in the blood stream from the pituitary gland to this organ and stimulates the ripening of the follicle through the characteristic stages of the corpus hæmorrhagicum followed by rupture and discharge of the ovum, subsequent conversion to corpus luteum, and final fibrosis, the corpus albicans. By the administration of prolan it is possible to demonstrate the formation of *corpora hæmorrhagica and corpora lutea*. The diagram indicates these relations (Fig. 1).

According to the views of Aschheim and Zondek, the prolan can be divided into two factors which are referred to respectively as A and B; prolan A being responsible for the formation of the corpus hæmorrhagicum, and prolan B for the formation of the corpus luteum. Many workers however doubt the existence of the two factors, and in any case it is safe to say that the separation has not been established by unequivocal experiments.

The main function of the prolan is therefore to initiate the maturation of the follicle followed by ovulation and the formation of corpus luteum. When the ovary is passing through these changes it also produces its own internal secretion, œstrin, which passes from the ovary to the uterus and the vagina, and produces the characteristic changes of œstrus.

Actions of Œstrin

It was not until an accurate method of testing for this hormone was devised that research on the chemical nature of œstrin could be undertaken. The test consists in studying the effects of injections of œstrin upon castrated rats or mice.

In these rodents the changes accompanying the reproductive cycle are characterised by a certain cell-picture in the vaginal contents. It is usual to classify the periods in the œstrus cycle as di-œstrus, pro-œstrus, œstrus, and meta-œstrus. If a vaginal smear be made of an animal in the di-œstrus or resting stage, and it be stained in some suitable manner, it will be noticed that the field will be crowded with leucocytes. The animal is incapable of impregnation and it is in this condition that the castrated or ovariectomised animal remains for all time.

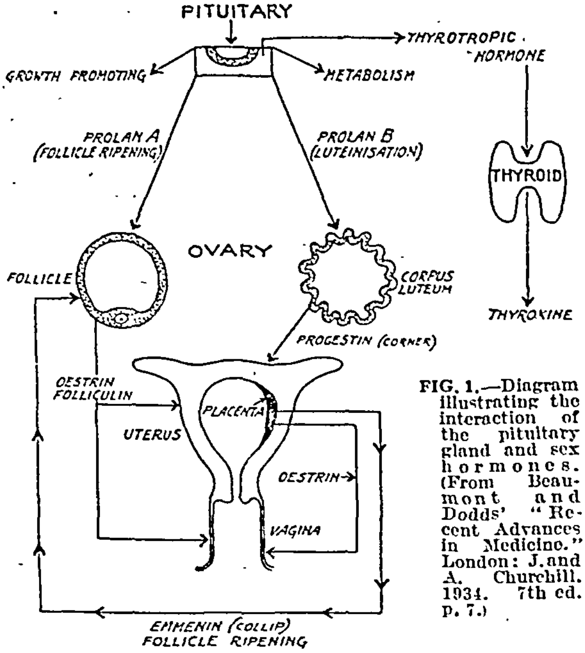

FIG. 1.—Diagram illustrating the interaction of the pituitary gland and sex hormones. (From Beaumont and Dodds' "Recent Advances in Medicine." London: J. and A. Churchill. 1934. 7th ed. p. 7.)

After five days or so the di-œstrus period gives way to a period of pro-œstrus, in which it is found that the leucocytes have disappeared from the field and a number of nucleated epithelial cells have appeared. At this stage the animal is incapable of receiving the male, but in a few hours this period changes to one of full œstrus when it can be seen that the field is occupied by non-nucleated cornified cells. The appearance is characteristic even to the naked eye and cannot be mistaken by the experienced observer.

At this stage the animal receives the male and is capable of becoming impregnated. If this does not occur, nucleated epithelial cells begin to appear again, and leucocytes characterising the stage of meta-œstrus; and finally di-œstrus is reached. There are various other changes which occur in the body at the height of œstrus. The uterus enlarges and the cavity becomes distended with fluid. All these changes occur as the result of œstrin secreted presumably by the ovaries. If the ovaries are removed the animal remains in a permanent state of di-œstrus, and it has been found possible to use such animals for investigating the activity of ovarian extracts.

The first successful experiments on these lines were performed by Allen and Doisy (1923). These observers were able to show that an alcoholic extract of ovaries was capable of inducing all the stages of œstrus in castrated animals, thus obtaining absolute evidence of the activity of a stable extract. From this time onwards rapid advances were made in the chemistry of the compound. The distribution was rapidly worked out, and the substance was found to be present in the ovaries and follicular fluid; it was also found in large quantities in the mammalian placenta. Unfortunately alcohol and volatile solvents will extract from body tissues a complex group of substances all with very similar properties, and consequently very little progress was made in the determination of the exact chemical constitution of the œstrus-producing hormone. It was, however, quickly proved to contain only carbon, hydrogen, and oxygen, but its separation from inert contaminants proved an all but impossible task.

Another great step was made through the discovery by Aschheim and Zondek (1927) that the œstrus-producing hormone was excreted in the urine in mammalian pregnancy, and moreover, in this situation it is not contaminated with the mass of substances that are found in alcoholic extracts of tissues.

At the same time Aschheim and Zondek also noticed the presence of prolan in the urine, and upon this discovery is based their well-known reaction for pregnancy. Œstrin may appear in conditions other than pregnancy, but apart from hydatidiform mole, the presence of prolan in the urine in any quantity is a specific sign of pregnancy.

A simple benzene extract of the urine was found to yield large quantities of the œstrus-producing hormone in a state of purity which has hitherto been deemed almost impossible, even with the most elaborate purification. Groups of investigators throughout the world commenced to study chemical properties, and in a relatively short time the hormone was obtained *in crystalline form*. Doisy and his collaborators in America (Doisy, Veler and Thayer, 1929 and 1930) and Butenandt in Germany (1929), independently and almost simultaneously, announced the crystallisation of the substance. At a later date Marrian (1930) and Laqueur and his co-workers (1929, 1930) also obtained crystalline products.

Chemical Relationships of Œstrin

It must be remembered that up to this date no one had any idea as to what group of organic compound œstrin belonged. The properties would fit in with a number of well-known groups, and the only remarkable features concerning the crystals were, first their extreme potency—namely, some 10,000,000 international units per gramme—and secondly their stability towards organic reagents and alkalis. I do not propose to trace the various steps leading to the adoption of the formula now believed in, since this would take too long and would prove tedious except to pure organic chemists. A number of workers have taken part in this important research, and amongst their names are to be found those of Doisy, Butenandt, and Marrian (see general references). We believe to-day that œstrin has the following formulæ (Fig. 2):—

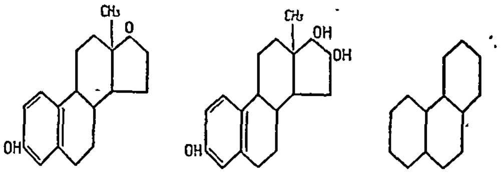

FIG. 2.—Ketohydroxy œstrin. Trihydroxy œstrin. Phenanthrene.

It belongs to a group known as condensed carbon ring compounds and consists of a series of three six-membered rings fused together with a five-membered ring at one end of the molecule. It is a derivative of phenanthrene which is shown here, and until comparatively recently it was not known that this group of bodies occurred in the animal organisation. The phenanthrene molecule has been known for many years to be possessed by certain drugs such as morphine, which, however, has quite a different molecule.

The condensed carbon ring system is now known to be of very great importance among the organic compounds occurring in the body. These include cholesterol and its derivatives the bile acids, ergosterol and calciferol, and the male and female sex hormones. One can state, therefore, that the organic chemist has provided the physiologist, biochemist, and physician with an entirely new problem in metabolism—namely, that of the sterols or condensed carbon ring compounds. The formula shown in Fig. 3 indicates the relatively close relationship of the important members of this group.

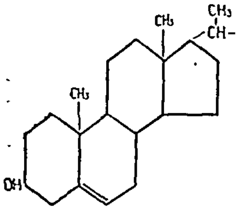

FIG. 3.—Cholesterol.

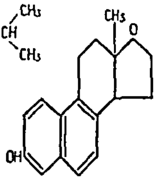

FIG. 4. Equilenine.

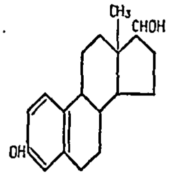

FIG. 5. Dihydrofolliculin.

In general it may be stated that the active members consist of a phenanthrene molecule with a five-membered ring attached to one end of the molecule, and that various polar groups, side chains, double bonds, &c., are possibly associated with the different types of activity of the different molecules. One of the most interesting observations in connexion with the œstrus-producing hormone arose through a consideration of its molecular structure. The first compound isolated in the crystalline form by Doisy had the formula $C_{18}H_{22}O_2$ and it has proved on subsequent investigation by Butenandt and others to be ketohydroxy-œstrin of the formula already given. On the other hand, the substance isolated by Marrian (1930) has been proved by them to have the empirical formula $C_{18}H_{24}O_3$. It therefore contains one more molecule of water than the ketohydroxy-œstrin.

It is very interesting to note that both ketohydroxy-œstrin and trihydroxy-œstrin are capable of producing œstrus in animals, but that the latter is much less active than the former. Here is an example of a hormone that may have slight differences of molecular construction and still retain its activity.

Marrian also succeeded in isolating another interesting compound that is quite inactive in the doses in which it has been tested up to the present. It is an alcohol which is known as pregnandiol (Marrian, 1929).

Girard (1933) has isolated a series of interesting compounds from the urine of the pregnant mare, one of which he terms equilenine. The formula of equilenine is shown in Fig. 4, and it can be seen that it differs remarkably from the formula of the œstrus-producing hormone, in that two of the rings are aromatic.

Yet further interesting experiments may be performed by modifying the construction of the molecule. Thus it may be shown that if the follicular hormone be partially hydrogenated and two atoms of hydrogen be added, the compound known as dihydrofolliculin is produced (formula shown in Fig. 5). In this case the activity increases from 10,000,000 to 40,000,000 units per gramme, and the compound becomes infinitely more active when administered by mouth. If further hydrogenation be undertaken and the aromatic ring be completely hydrogenated with the addition of another six atoms of hydrogen, the compound loses its power of producing œstrus, but develops the properties of the male sex hormone —namely, that it will cause comb growth in the capon and enlargement of the seminal vesicles. Moreover, trihydroxy-œstrin may be converted to ketohydroxy-œstrin by vacuum distillation over potassium bi-sulphate.

We can see, therefore, that starting from a substance manufactured by the body, it is possible to effect minor changes in the molecular construction which increase and decrease the œstrogenic power, and it is even possible to produce compounds capable of taking the place of the male sex hormone.

Girard has illustrated the relationship between the bile acids and the compounds that we have just discussed, in the manner shown in Fig. 6.

It must be remembered that up to the present the starting material has been the naturally occurring substance, ketohydroxy-œstrin. Attempts to synthesise compounds of this type are fraught with the very greatest difficulty, since in addition to the complication of the individual preparations, the question of stereo-isomerism enters.

Clinical Use of Œstrin

It might perhaps occur to the pure clinician to inquire what is the practical outcome of all this organic chemistry. Fortunately it is very easy to answer this question.

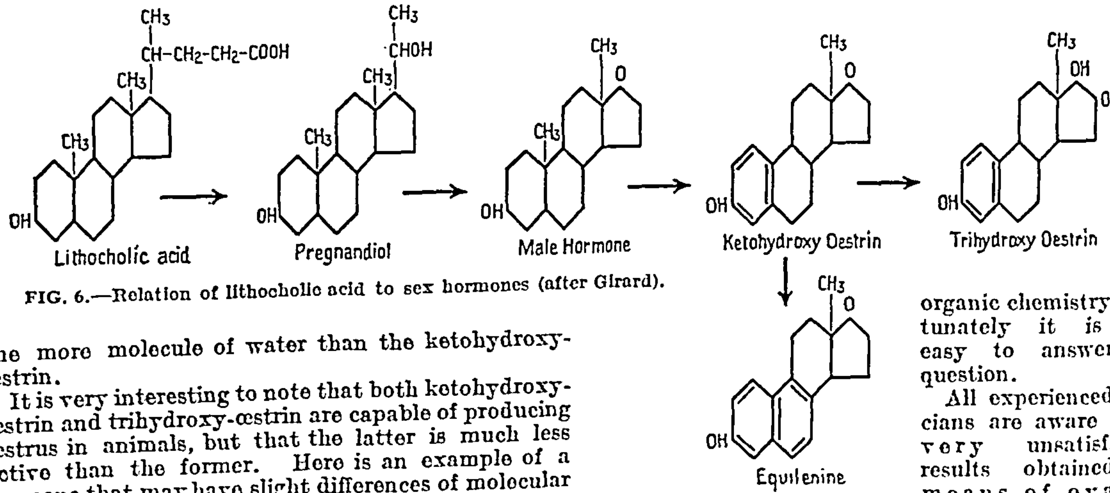

FIG. 6.—Relation of lithocholic acid to sex hormones (after Girard).

All experienced clinicians are aware of the very unsatisfactory results obtained by means of ovarian therapy, and it is safe to say that most gynæcologists of experience regard all methods of substitution therapy as valueless. The reason for this is quite apparent if a moment's consideration be given.

If we take the mouse unit as the unit of œstrin, we know that one mouse unit will produce œstrus in a mouse. Marrian and Parkes (1930) have shown that it is necessary to give some 200 to 300 units in order to produce the full œstrus together with uterine changes; in other words, some 300 units must be administered before the full physiological results can be obtained and the animal will accept the male. Parkes and I were able to show that provided the same method be employed, the rat unit is ten times the mouse unit—in other words, in direct proportion to the body-weight. Therefore 3000 units would have to be given to a rat to produce the full physiological change. Parkes and Zuckerman (1931) have shown that the ovariectomised baboon requires a quantity of œstrin in direct proportion to its body-weight, and arguing on these lines it is obvious that a woman would require some 500,000 international units of œstrin to produce a physiological effect.

At a meeting of the Royal Society of Medicine some time ago these figures were mentioned and were treated with derision, since it was argued that under no circumstances would it be possible to produce a sufficient quantity of material for the treatment of even a few cases, and in any case the expense would be prohibitive. At a meeting of the same society on Feb. 13th, 1934, C. Kaufmann described his experiments with women who had undergone the operation of complete ovariectomy but with the uterus still intact. He described how he was able to produce complete menstruation by the administration of some 500,000 to 1,000,000 units of œstrin together with a small quantity of the corpus luteum hormone. I have also been able to repeat these observations and to check the result by curettage. Kaufmann (1934) proved conclusively that it is possible to produce a complete menstrual period in an ovariectomised woman, and also to cause enlargement of the uterus in cases of infantilism; and at the same time to treat menopausal symptoms with huge doses of the œstrin.

These remarkable investigations would not have been possible but for the elaborate and painstaking chemical work that I have described. The study of the methods of separation which resulted in a very good commercial yield of ketohydroxy-œstrin, and the brilliant discovery of Schwenk and Hildebrandt in Schoeller's laboratory (1933) that the partially hydrogenated product enabled the yield to be quadrupled, has made it possible to produce œstrin in sufficient quantities for this entirely new branch of therapeutics to be opened up.

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INTERNATIONAL COÖPERATION IN PUBLIC HEALTH

ITS ACHIEVEMENTS AND PROSPECTS [*]

BY SIR GEORGE S. BUCHANAN, C.B., M.D., F.R.C.P. Lond.

LECTURE II

Cancer Studies

PERSONALLY I have always opposed proposals that the League's Health Organisation should enter on the road of conferences on cancer at large; we are not strong enough to do them well, nor do I believe that much good would come of them from the official point of view. But still, cancer is among the greatest of the causes of mortality, and all Government health services, sooner or later, must occupy themselves with cancer questions. At Geneva we have selected two lines: first the comparison of national cancer statistics, which occupied us from 1923–27; and later, the results of radiological treatment of cancer of the uterus. For both there were special reasons.

Comparative Studies.—A Cancer Commission of the Health Committee, of which I had the honour of being President, was appointed in 1923 and reappointed in 1926. Up to 1927 the principal work of this Commission consisted in making serious endeavours to ascertain the different causes which produced the very notable difference in the mortality from cancer in certain, mainly European, countries. The countries in question all possessed national mortality statistics for a long series of past years, and there was no prima facie reason to consider any one of them to be more favourably placed than the others in regard to accurate diagnosis of cancer as a cause of morbidity or mortality. The sites chosen for study were the breast and uterus, organs for which on the one hand diagnosis of the cause of death is relatively easy, and on the other hand the mortality differences between the countries was most striking.

The inquiry was pursued by expert statistical analysis of massed figures and also by special sampling investigations organised by the Commission, and numerous useful monographs on different aspects of the question were obtained. When the inquiry was rounded off, in October, 1927, by the summarising report (C.H. 631), there were both failures and successes to record: failures, in that every conceivable method of analysis open to the Commission and its distinguished experts had failed to produce any single clear-cut explanation of the divergencies in the national mortalities from cancer in the countries studied; successes, in that many plausible a priori explanations had been thoroughly tested and found wanting. The ground was cleared of all kinds of misconceptions about the effect of registration systems, age-distribution, marital state, racial proclivity, and the like —work which wanted doing, and could only have been secured by the special international expert methods of inquiry which were followed. And a further and not inconsiderable practical benefit resulted; the so-called "natural" duration of cancer in these sites was determined on a broad basis of observation, while the predominating importance of early diagnosis and early operative (or radiological) treatment was illustrated equally for every country: useful public action for the prevention of cancer of these sites, in present knowledge, consists almost wholly in facilitating this early diagnosis and treatment. Among the British participants in this work grateful mention must be made of Prof. Major Greenwood and Dr. Janet Lane-Claypon.

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[*] The Milroy Lectures delivered before the Royal College of Physicians of London on Feb. 27th and March 1st, 1934, with a few subsequent additions of detail. Lecture III. will appear in a coming issue.

The Health Committee, in 1928, following the advice of the Cancer Commission itself, decided to regard these comparative inquiries as completed. Their resumption after a few years, perhaps with some new methods of approach, may well prove desirable.

RADIOLOGICAL TREATMENT

The work of the sub-commission appointed on this subject is summarised in a report of June, 1929 (League publication C.H. 788), which—in English-speaking countries at least—has received much attention and been recognised as authoritative. This report set out some very necessary general principles in regard to the use of radiotherapy in general. In addition, the way in which radiotherapy was applied to cancer of the uterus at Paris, Munich, and Stockholm was explained; and the necessity for standardising observations and records, including facts as to recurrence of the growth and length of survival after treatment, was demonstrated.

It emerged from this inquiry that while governments, and hospitals, and philanthropists are spending enormous sums on the purchase of radium and in the provision of other radiological treatment, no satisfactory way of assessing or comparing results of different radiotherapeutic methods can be found unless the principal radium and gynæcological institutes will agree to adopt (1) a standard nomenclature to describe the stages of the disease; (2) an agreed method of case-recording; and (3) a satisfactory system of following up treated cases to ascertain their condition at least three years after treatment.

The recommendations of the Radiology sub-commission, endorsed by the Cancer Commission and the Health Committee, were quite explicit and authoritative on these three requirements. It was then necessary to promote their observance, and in due course to collect the results and submit them to competent expert analysis. For this purpose recourse was had to administrations, institutes, and individuals in a considerable number of countries, which were provided with special case-record books in different languages. It was necessary, moreover, to explain the method which it was desired to follow in some detail, and so far as possible to arrange that some one person in each country would be charged with the distribution of the records and would periodically report on their use. For the United Kingdom this duty has been undertaken by my colleague, Colonel Smallman, and some 30 of our more important hospitals and institutes have for over two years kept particular records of radiologically treated cases of cancer of the uterus on the international form, in addition, in many cases, to the maintenance of other records of the same cases for the purposes of our own Radium Commission. The lines on which an ultimate analysis of these records will be made are to be settled by a conference of gynæcologists and radiologists to be held this year in Zurich, at the same time as the International Radiological Congress. It is impossible to forecast the results, but it seems equally impossible to believe that the examination of data obtained on these uniform lines by so many responsible authorities will not supply a definite and useful addition to knowledge of the subject which would be unobtainable in any other way, and which will itself justify the trouble which has been taken in recording cases and in following them up from year to year to ascertain their after-histories.

I have dealt rather at length with the expert commissions and inquiries undertaken from Geneva into essentially medical subjects as it is a part of the work which is perhaps not as well understood as it deserves to be, and yet at the same time appears to me to offer great advantage to medicine if it is used judiciously and with discrimination and always with the intention that its quality should be such that the professional man and technician will associate good solid work with a League Commission on the subjects he knows about. It is only in this way that the meetings of the "experts"—you must pardon the inevitable Geneva term because of its convenience—can be made more than occasions for an agreeable interchange of platitudes and a search for convenient formulæ to hide divergence of opinion and enable each participant to go on his own way as before. All who take part in these joint inquiries should feel that they have an unusual opportunity which may not recur to gain from pooling knowledge and collectively to advance it. The function of the Health Organisation is the modest but essential one of providing the opportunity; and of seeing that, when appropriate cases arise, medicine obtains the advantages which an experienced international organisation, with its headquarter mechanism, translators, précis writers, and funds can supply with greater ease than another. Given care and thought in the selection of what is appropriate from the side of medical needs I see no reason for any check in the progress which has thus far been made; on the contrary, there is every reason to hope for its extension as its quality becomes better known and more impulses for its continuance come from the medical side in different countries.

General Work of the Health Organisation of the League of Nations

My references to the other directions in which the League of Nations has occupied itself with public health work must be brief; many of them are better known than the essentially medical activities I have just been speaking of. There is a most important service of the League for *industrial medicine*. My reference to it must be brief, since the Conventions and Agreements relating to industrial hygiene, as well as its journal "Occupational Hygiene," are not dealth with by the Health Organisation, with which I personally am familiar, but by a separate medical section of the staff of the International Labour Office, deriving authority from the general duties placed upon that Office in the Covenant.

SERVICE OF INDUSTRIAL MEDICINE OF THE INTERNATIONAL LABOUR OFFICE

This service has an expert staff, budget, and procedure, all under the direction of the International Labour Office, which, though an organ of the League of Nations, has its own constitution and independent international obligations. On the health side, in the United Kingdom, this work naturally comes to the medical branch of the Factory Department of the Home Office. The service was created within the International Labour Office on the recommendation of the Hygiene Commission appointed by the Washington Conference in 1919, and it is charged with the study of health conditions amongst all classes of workers, and with the maintenance of close and constant contact with the government medical departments concerned with the administration of labour legislation. Its principal duties fall into two categories:—

1. The preparation of subjects for consideration by the International Labour Conference, with a view to the adoption of *Draft Conventions and Recommendations* which are eventually submitted to the competent national authority in each country for ratification or other action.

2. The collection and dissemination of information on all matters relating to industrial health, which are likely to be of international interest.

Some 32 international conventions have been concluded to date through the International Labour Office, and have been ratified to a larger or smaller extent by States non-members as well as by States members of the League. Of these, those which have resulted specially from the work of the service of industrial medicine relate to White Lead (1921) and Compensation for Occupational Diseases (1925); while the Governing Body of the I.L.O. is also responsible for other conventions specially concerned with occupational hygiene, such as those on Childbirth (1919), and on the Medical Examination of Young Persons at Sea (1921). Besides effecting these international agreements the Governing Body has in many cases submitted detailed recommendations to Governments on action to be taken in health questions affecting the worker; for example, Anthrax, White Phosphorus (1919), Lead poisoning, Maternity in Agriculture (1921), and general principles of sickness insurance (1927).

The service, under its Director, Dr. L. Carozzi, has organised technical studies on the above and other subjects by means of special expert committees—e.g., for anthrax, lead poisoning, and silicosis—or by means of its Correspondence Committee; the results coming for action to the Governing Body of the I.L.O.

The service has also collaborated with various national bodies in the study of industrial fatigue, the occurrence of tar and pitch cancer and cancer due to mineral oils, and of colour vision tests for railwaymen and seamen. It maintains a continuous review of industrial medical questions which is published by I.L.O. under the name of "Occupation and Health," with a corresponding issue in French. The service at present is giving special attention to the protection of married women in industry, to the pathology and hygiene of workers handling solvents of acetyl and nitro-cellulose, as well as silicosis, on which a special study, greatly aided by Dr. Irvine of Johannesburg, has been made since 1925, with notable practical results.

INTERNATIONAL REGULATION OF OPIUM AND DRUGS OF ADDICTION

I should mention also, but again without attempting to develop the subject, that the Health Organisation of the League, in conjunction with the Paris Office, fulfils certain technical duties in connexion with the organisation at Geneva for the control of opium and other drugs of addiction. The health organisations here have no concern with administrative policy, but they advise when cases are put before them in regard to particular drugs to which the provisions of the Opium Convention, 1925, should apply as being drugs of addiction, or for which exemptions should be allowed. This work, as may be supposed, is confided by both Offices to an expert Commission.

THE HEALTH MISSIONS OF THE LEAGUE

Public health questions have proved a very useful means by which the League of Nations has been able to make its influence felt in different parts of the world, particularly in extra-European countries which have no very strong urge to participate in the many of the political branches of the League's work. Looking down the list of missions, collective or individual, which have been arranged from Geneva, one notes visits for one or other public health purpose to Persia, to the Islands of the Pacific, to Bolivia and Liberia, and to a considerable group of Latin-American countries, in addition to the special attention which has been given to Eastern Europe—e.g., Czechoslovakia, Yugoslavia, and Greece. To this must be added a quite special attention to health conditions in the Far East, which began with Dr. Norman White's mission to Far Eastern countries, particularly on quarantine questions, in February, 1924, and which in recent years have been conducted on a very considerable scale, mainly under Dr. Rajchman's own direction, in China. It is difficult to generalise about these missions. Their objects have been very different, and the choice of personnel, collective or individual, has, of course, depended on the purpose in view. In all cases, however, they have constituted a response from the League to a request from the country or countries concerned for consultation or advice on some administrative question or on some particular matter of disease prevalence. They have resulted at the time in instructive reports, and not seldom the recommendations made in these reports have been the starting point of definite administrative changes, or the foundation of a new school of hygiene, the reorganisation of hospital services, and like matters. The mission has served the purpose of an activator.

These missions have sometimes been conducted by medical officers of suitable nationalities whom the League has borrowed, sometimes by members of the salaried staff of the Health Section at Geneva, and sometimes by a combination of both. They form an excellent example of the principle that countries' members of the League should help each other as far as possible. If rightly carried out, these missions can be so arranged and conducted as to avoid any impression or intention that it is the business of the League's Health Organisation to be in any way executive, or to constitute itself a super-health authority which supervises or criticises the public health administrations of the world. It is particularly important, in my view, that no such impression should be created. Countries have a complete right, subject to the observation of any international agreements to which they are parties, to care for the health of their people in their own way, as their traditions or their policies lead them. I doubt if the world would gain by having stock patterns of administration pressed upon nations by any central authority; I feel sure it would not benefit by stock patterns of national administration in medicine or hygiene. Any recommendations on administrative matters which come from the League must always be considered from this point of view. If, for example, advice were given to all countries in the world which assumed that medicine and public health ought, for choice, to be effected through an all-embracing State insurance system, or ought all to be worked by central authority, it would not help us in the United Kingdom to have such advice thrust on us exotically, even if we favoured the principles. And as we could not favour the principles, we should only weaken the League and waste valuable time, by having to be continually on our defence against them.

Reverting to League missions it is worth noting, in passing, that where the medical side has been only one of the aspects of the mission, the medical representative has sometimes proved so valuable that the League has afterwards used his services for wider purposes. Dr. M. D. Mackenzie's visit to Liberia—e.g., in October, 1931—was followed by his being designated by the League in the following year to be one of the Commissioners appointed to delimit frontiers and settle intertribal disputes in that country. Similarly, on a larger scale, the energy with which Dr. Rajchman threw himself into the creation and organisation of health services in China under the Nationalist Government has led to his now being seconded from the post of Medical Director to that of the chief representative of the League in China in respect of all technical questions—economics, communications, opium control, &c., as well as health, on which it has been decided to maintain a special liaison between the Chinese National Government and the League. As the expenses of these missions may be considerable, it should be noted that they do not necessarily fall on our health budget; in the case of Latin-America and China they fall on special funds voted by the Assembly.

In connexion with the funds of the Health Organisation, it is well also to note that the normal budget does not allow us at Geneva to undertake work for the suppression of epidemics or give medical services in the case of catastrophes such as floods and earthquakes out of our own funds. Something has from time to time been done in these directions under special funds, notably in the early days of the League. In general, however, any assistance which has been possible to particular nations in times of epidemics has been limited to local visits and advice and not extended to the employment of staffs or the provision of hospital or other material.

INTERCHANGES AND INTELLIGENCE WORK

At an early stage donations from the Rockefeller Foundation enabled the Medical Director to inaugurate a method of mutual instruction in public health administration to be evolved by what is known as the "interchange" system. Two methods are followed under this system. In the first a public health officer, or in some cases a man appointed to a public health post which he has not yet taken up, is given special facilities for visiting selected countries for the purpose of study. This is little more than an extension of what is done, on a larger scale, by the Rockefeller Foundation itself. In the second, "collective" interchanges are arranged—that is to say, a group of medical officers of different countries is brought together for a number of weeks during which it visits a selected country for study of its principal health problems and public health methods. In a few cases also these "collective" interchanges have been specialised to particular subjects—for example, milk control or rural hygiene. The "interchange" system is a distinctive feature in the Geneva work. Not the least advantage of the "collective" interchanges has been that the health authorities of the country visited take pains in advance to consider the questions which their foreign visitors are most likely to ask, and the information which should be prepared for them, so that the visit has produced a number of valuable monographs describing the main lines of medical and public health activities. This has been done, for example, for France, Germany, Switzerland, and Denmark, and, last year, excellently for Poland. Naturally the number of participants from any given country is small but we have secured the benefit for several central or local health officers in the United Kingdom. In the case of visitors to this country, either collectively or individually, we were fortunate at the beginning to secure the assistance of the Society of Medical Officers of Health, while later, the London School of Hygiene and Tropical Medicine undertook to provide an organised centre from which the tours and interviews of foreign visitors are arranged. I may venture here to testify to the smoothness and efficiency with which this work is undertaken at the School and the obligation which the organisers of these interchanges are under to Medical Officers of Health, Directors of Institutes and other bodies for the time and labour which they are frequently asked to sacrifice in giving necessary explanations and demonstrations to our foreign visitors.

Besides using this interchange system to collect and publish information regarding the practice of public health administration in different countries, the medical staff at Geneva sometimes achieves the same object by making visits themselves or arranging for them to be made by others. Some of these inquiries have been concerned with particular aspects of public health work—e.g., rural hygiene or the control over tuberculosis and leprosy; an inquiry into certain aspects of public hospital provision in the United Kingdom is now in progress. Mention should be made here of the series of Statistical Handbooks (for 14 countries, done under the advice of Prof. Major Greenwood) issued as League publications between 1924 and 1928. Their object was to supply for each country an account of the way in which its system of obtaining and classifying mortality statistics has been evolved, and what particular considerations relating to that country must be kept in mind by the student who is using its national death-rates.

Of course, when it comes to obtaining information about the main lines and policy of public health work and medical practice in another country, much care has to be taken by the foreign observer to get the essential points of the picture and set the national practices in their proper relation to the method of government and characteristics of the country concerned. It is by no means easy for the stranger to avoid giving disproportionate emphasis to particular matters which have struck him as novel or unusual. He may create unexpected difficulties by his criticisms, or at the other extreme his reports or observations may be embarrassing to the national administration by the praise which he has given to what those who know consider unsatisfactory. That these difficulties are not insurmountable, especially when the observer is in a position of complete freedom in his reports, has lately been shown by the series of international studies conducted for the Milbank Memorial Fund by Sir Arthur Newsholme and his collaborators, and has been shown also in the reports of experts who have reported for the Health Section of the League. At the present time there is particular value in some of these reports on medical developments abroad. Under the new dictatorships and oligarchies of European countries, entirely new methods of health administration and arrangements for the care of the sick are being introduced and imposed from above, sometimes with all the impulse of a freeing of national spirit and with all the force of modern propaganda. If in the United Kingdom we do things differently for the reason that medical and public health progress is not with us a new thing, but has gone on through generations as part of the normal requirements of our central and local government, it does not follow that our slower evolution has always led us to the points which the countries now starting from scratch are endeavouring to attain by a single jump. Our own progress may not be leading us in the directions being aimed at—for example, in Poland or in the U.S.S.R.—but it is certainly advisable to realise what the aims and objects of such countries are. In Poland, for instance, during the last few years they have created a huge new system of preventive medicine by means of local health centres under State direction throughout the country, and at the same time have developed their system of health insurance to the extent that 80 per cent. of the population receives treatment under the insurance agencies which is not merely domiciliary, as with us, but includes hospital beds and all kinds of specialist services. In the U.S.S.R. all treatment and prevention of disease are recognised as being from first to last an affair for the State to provide, while it is regarded as legitimate to use the medical services and the results achieved by them as a political weapon in the hands of the Government—for example, as a weapon in the official war against religion. We can, and should, keep our own national lines, but we cannot afford to ignore the results which are being rapidly obtained under these new systems; we should know the facts and learn the lessons they can teach us.

FAR EASTERN HEALTH BUREAU AT SINGAPORE

Sketchy as it necessarily is, my reference to the work of the Health Organisation of the League would be too incomplete without some words about its Far Eastern Bureau at Singapore. The medical secretariat at Geneva has at Singapore a kind of branch office. Its first Director was Dr. Gilbert Brooke, and after him for some years Dr. Gautier, who now directs the publications at the Geneva Office. The office is now filled by Dr. C. L. Park, a senior officer in the Australian Commonwealth Public Health Service, who also brought to it a large experience of the League of Nations' work. The idea that the League would do some special work in health for the Far East presented itself to us quite early; we owe it, in fact, largely to the Japanese delegate, Dr. Miyajima, and to the example set by Japan, which gave special subsidies and facilities for the purpose. Its actual establishment followed a notable tour by Dr. Norman White to the Far East in 1922–23. At that time, so far as international official agreements about infectious disease were concerned, we were still under the system of intercommunication through diplomatic channels, and Dr. White showed that in this part of the world these agreements for the mutual communication of information meant little in practice. He also showed us that the measures taken in regard to the formidable infectious diseases, notably cholera and plague, were being conducted by the countries and colonies on individualistic and arbitrary lines which were difficult to defend. Whatever might ultimately be done in the way of reforming quarantine procedure in the Far East, one thing seemed immediately practicable and desirable—namely, to arrange that the public health authorities of different countries in that region had a good system of exchanging information about the existence of infection in their ports. The first object of the Far Eastern Bureau therefore was to be the centre through which, with the minimum of formalities, the different countries could pool their information about epidemics. Evidently a great deal of use could be made of wireless messages, and we were satisfied that, whether for wireless or for cables, a code should be feasible which would enable essential facts to be sent through quickly and economically. The Bureau at Singapore was set up with the financial assistance not only of some of the Far Eastern Governments but also, and very substantially, with the aid of the Rockefeller Foundation. It was organised on the advice of and after several conferences with representatives of various Far Eastern medical services, notably those of India, the Dutch East Indies, Japan, and the United States for the Philippines, and it was provided with an Advisory Committee on which the services of Major-General J. D. Graham, late Public Health Commissioner with the Government of India, were invaluable, and over which he presided for several years. On the advice of this Committee also the Bureau has occupied itself with other matters of interest in disease prevention in these regions, notably with coördination of researches into epidemic diseases.

The Bureau was a going concern and had fully justified the intentions of its founders by 1926, when the International Sanitary Conference of Paris, to which I will presently refer, was held, and the whole question of organising the transmission of news regarding infectious diseases at ports was placed on a new basis. The basis then adopted, in fact, was one which the Singapore Bureau had already shown to be practicable. One of the clauses in the 1926 Convention enabled the work of the Bureau to be utilised in the world scheme which has since been put into operation. It has continued and extended the work for which it was founded, and has been of substantial value by providing an outpost from the Geneva office working for a large section of the world which can only have a limited contact with Europe.

I may add here, though it has no connexion with the League of Nations, that there is another international bureau which obtains information about infectious diseases over as wide a region. This is the Pan-American Sanitary Bureau at Washington, whose intelligence system, greatly aided by the United States public health service, covers the two Americas. Like the Singapore Bureau for the Far East, it is now linked up in the common world system of information about epidemics established internationally in 1926.

THE PAN-AMERICAN SANITARY CONFERENCES, BUREAU, AND SANITARY CODE

The creation of the Pan-American Sanitary Conferences and of the Pan-American Sanitary Bureau was authorised by resolutions adopted by the Second International Conference of the American States, which met in Mexico City, Oct. 22nd, 1901–Jan. 22nd, 1902. These Conferences and the Bureau were originally known as "International" instead of "Pan-American," the names having been changed because of the creation of the Office International d'Hygiène publique of Paris.

The Pan-American Sanitary Bureau, which is the executive organ of the Pan-American Sanitary Conferences, was actually formed or organised by the First International Sanitary Conference of American Republics, which met in Washington, Dec. 2nd, 3rd, and 4th, 1902. Each succeeding Sanitary Conference, of which there have been seven, has elected (or re-elected) the officers of the Bureau, consisting of an Honorary Director, the Director, the Vice-Director, a Secretary, and four members. Employees are appointed by the Director.

The status of the Pan-American Sanitary Bureau is definitely fixed by the Pan-American Sanitary Code (Chapter IX., page 13), an international sanitary treaty which revised (and in part reiterated) the Washington Convention of 1905. This code or treaty was signed by the Seventh Pan-American Sanitary Conference at Havana, Cuba, on Nov. 14th, 1924. It has been ratified by 19 American Republics to date, and its provisions are adhered to by the Health Authorities of the other two.

This code was prepared for inter-American practice, and was based in large measure on the International Sanitary Conventions. It has not been superseded by the International Sanitary Convention of 1926, to which it is regarded as forming a complementary though independent document.

The Bureau, since the Directorship of Surgeon-General Cumming in 1920, has sent technical officers to different American States for special services; it publishes an official bulletin besides providing the intelligence system above referred to.

To avoid a confusion which sometimes arises, it should be added that the Fifth International Conference of American Republics (not a Sanitary Conference) authorised the Director of the Pan-American Sanitary Bureau to call together in Washington, once in five years, the Directing Heads of the Departments of Health of the 21 American Republics. This body is separate and distinct from the Pan-American Sanitary Conferences and on a different basis. Whereas delegates to the Pan-American Sanitary Conferences have plenary powers within certain limitations and can actually make *ad referendum* treaties, the meetings of the Directors of Health have no such powers

Office International d'Hygiène Publique

It will have been realised that when dealing with the League of Nations health work one has been concerned with expert consultations, missions, intelligence work and the like which essentially are dependent on and arranged by the Medical or Health Section of the League Secretariat, and to a considerable extent carried out by its own medical staff. This Health Section has the aid of a Health Committee of the League, appointed by the Council triennially, which advises on principles, receives reports (often after their publication), and forwards them to the Council. Meetings of this Committee are regulated accordingly and are not now held very frequently. At the Office International d'Hygiène publique in Paris the position of its Permanent Committee is quite a different one. The greater part of the work of that Office is based on regular half-yearly sessions of the Committee itself and on the communications which the Government delegates who form the Committee make themselves, or bring from the experts they have consulted in their own countries. The half-yearly sessions of the Paris Committee are busy ones, extending over ten days. The Governments now represented by delegates are as many as 51—in the case of the British Empire including separate delegates for the several Dominions and India and for the British Colonies. The United States and Russia—now the U.S.S.R.—have been represented from the beginning, while such important countries as Japan and Germany, Rumania and Czechoslovakia have become members of the Office within the last ten years, and have strengthened it greatly by bringing in the work of their public health services. The funds of the Paris Office are derived exclusively from the participating Governments, on a system fixed in 1907. The annual total is materially less than that of the annual health budget of the League.

To appreciate what it is that keeps the Paris Committee busy and justifies the attendance of representatives of Government health services from all parts of the world, it is useful to glance back at the circumstances which led to the establishment of the Office International and its Permanent Committee by the International Agreement of Rome, 1907, under which it works. The roots will be found in the great epidemic visitations of plague and cholera in the earlier part of the last century. It is enough to turn to any contemporary accounts of these epidemics in the Levant—read for example the description of plague in Cairo in "Eothen"—and consider how these periodical scourges used to be feared by Mediterranean countries and in Europe generally, to appreciate the way in which every country had come independently to protect itself and its frontiers by the methods then thought to be possible and effective. It was the period of the erection of large lazarets for the detention of persons arriving from suspected places, if indeed they were not arbitrarily detained for days or weeks in harbour on the ships which brought them or were, quite inhumanly, refused admission and sent away to any other country. It was a time also when merchandise was rejected wholesale or destroyed on suspicion of infection, each country acting in these respects on its own lines and in its own lights. The situation in regard to plague and yellow fever had by 1851 become so troublesome and the inconveniences to commerce so great, particularly in the Levant and the Mediterranean basin, that an effort was made by a few countries by means of a conference in Paris in that year to obtain some mutual understandings about the requirements which they would make in the case of shipping in the Mediterranean basin. The countries sending delegates were Austria, Spain, France, Great Britain, Greece, and Sardinia, the British representative being Dr. Sutherland, at that time in the service of the Privy Council. There followed the war years of the Crimea as well as the cholera visitations of 1853 and 1854, increasing the confusion and leading to other conferences—at Paris in 1859, at Constantinople in 1866, and at Vienna in 1874. At these conferences the necessity of a common understanding made some progress, evident again at later conferences in Washington in 1881 and at Rome in 1885. But it was not until 1892 at Venice that a formal "sanitary convention"[1] between countries made its appearance. This was the result of a general desire to control the introduction of *cholera* into the Mediterranean basin from the East by the Suez Canal route. A conference in the following year at Dresden extended the mutual agreements on this subject, while in 1894 another international conference at Paris settled mutual arrangements for the sanitary regulation of the Pilgrimage to Mecca and questions of quarantine in the Persian Gulf. Then in 1896 came the revival of *plague* in Bombay and its rapid extension to various parts of the world. The plague position was taken up by an international conference in Venice in 1897, and following the appearance of plague in Egypt in 1899, the various conventions by this time established were again considered at the sanitary conference at Paris in 1903, which for the first time prepared an international convention which dealt both with cholera and with plague.

An important factor of these conferences and conventions, which essentially were concerned with the protection of Europe from eastern infection, was the fact that a large section of the Levantine ports were controlled by a quasi-international body at Constantinople—namely, the Constantinople Superior Board of Health. The history of this body, which dated from 1838, has been admirably recorded by Dr. Clemow.[2]

CONSTANTINOPLE SUPERIOR BOARD OF HEALTH, 1838–1914

As an administrative body in the old Turkish Empire, dependent in large measure on the foreign consulates at Constantinople, the Superior Board of Health passed through several changes and stormy periods during the 75 years of its existence. It became, however, an important organisation, which maintained a sanitary service (1) at all the chief ports of the Black Sea, in the Straits, and on the coast of Asia Minor; (2) in the Red Sea and for the Mecca Pilgrimage; and (3) on the Turko-Persian frontier and for the Shiah pilgrimage. It had a very large staff, chiefly of Levantine medical officers, and quite large funds; quarantine dues were high in the Near East during last century, and still remain so. Its functions came to an end at the outbreak of the war in 1914, and its formal winding up, the distribution of its property, and the compensation to its personnel were provided for by the Treaty of Lausanne, 1923, and completed in 1927.

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[1] In series, the General "International Sanitary Conventions" have been those of Venice, 1892; Paris, 1903; Paris, 1912; and Paris, 1926. The term "sanitary" dates back to the wider use of the word, as used for example by Simon in "English Sanitary Institutions."

[2] See THE LANCET, 1923, i., 1074, 1120, and 1180, and 1929, i., 93.

The action taken by the Constantinople Board was in large measure determined and regulated by the successive International Sanitary Conventions, and the same was the case with another quasi-international body, the Quarantine Board of Egypt, established about the same period. The latter has continued its existence and since the war has increased its importance in the scheme of protection against the transmission of epidemic diseases from the East.

LE CONSEIL SANITAIRE MARITIME ET QUARANTENAIRE D'EGYPTE

This body, usually known as the Egyptian Quarantine Board, has its headquarters in Alexandria. Financially, it depends, in major part, on the quarantine dues obtained for its services and in part also on the Government of Egypt. Its main functions are the protection of Egypt from invasion by infectious diseases on its frontiers, particularly its seaports, and the protection of the countries in the Mediterranean and beyond by means of the control which it exercises over the transit of vessels arriving from the south and passing through the Suez Canal. In addition, the Quarantine Board has various special health responsibilities in regard to the Mecca pilgrimage and pilgrim ships. The executive work is directed by the President of the Board, an appointment which now for a long period has been held by distinguished and capable administrators: Sir M. Amand Ruffer (1897–1917), Dr. Alexander Granville (1917–1923), the late Major C. F. Thomson (1925–1928), and its present occupant, Major J. Gilmour. The Board itself, on which for many years the British representative was Dr. A. Morrison, consists of representatives of the consular services of certain powers, whose position in the organisation has been determined by events in the history of Egypt which are political rather than medical. Authority formerly given to it by Khedivial decrees has been recognised internationally in successive International Sanitary Conventions, to which the quarantine regulations which it applies are expected to conform. The Convention of 1926 added some new duties to the Board, notably that of making an annual report on the general sanitary control of the Mecca pilgrimage and of forming a "regional bureau" of the Office International d'Hygiène publique in respect of intelligence about epidemics in countries in the Near East.

It is interesting to note, from evidence kindly given to me by Dr. Shahin Pacha, the present Minister of Health in Egypt, how far back this Board can trace its origins. It is a common assumption that the Board is a body originally imposed on the Government of Egypt by the European powers. In fact, however, it was a reverse process, as its beginnings are found as long ago as 1831, when Mahommed Ali called on the European Consular body in Alexandria to organise and apply measures against plague and other infectious diseases comparable to those then in vogue (and of appalling severity) in other ports of the Mediterranean; a request repeated and fortified in 1835, when the whole of the foreign consular body in that city were asked to undertake the direction of the service. As in those days, and long after until the opening of the Suez Canal in 1869, the ships to be quarantined were those arriving on the north from Mediterranean and Levantine ports, it is easy to understand how Alexandria was then, and has remained, the centre of all the Board's activities.

It is interesting to note the importance which in the middle of last century must have been attached in this country to the various conferences and conventions above mentioned, perhaps more from the commercial than from the public health point of view. It is true that we had had formidable invasions of Asiatic cholera in England, as no one is likely to forget in reading the English history of the century down to 1865. It was cholera almost as much as any other factor which determined the first establishment of a Government health service in the form of the Medical Department of the Privy Council. But that department, during the time of Simon's dogmatism and long afterwards, refused to place any serious reliance on attempts to prevent the importation of cholera. They considered periodical invasions of Europe (including England) by pandemic cholera to be inevitable. They desired, indeed, nothing to be done to diminish the lively apprehensions of cholera which were then doing so much good by bringing about the purification of our public water-supplies and by improving our internal measures of sanitation. The local sanitary authorities of our port towns were, of course, expected to protect themselves against the spread of cholera if it arrived, and had powers and duties to undertake inspection of ships within reasonable limits. But the work was essentially local. There was never at that time any question of Government subsidy or anything beyond the minimum of Government action at our ports. It was the time of great development of commerce on free trade principles, and the spirit of that time was all in favour of a British policy of freedom, which in many ways rightly prevailed, but sometimes went much further than other countries were disposed to accept, or even than we should be justified in maintaining now. This earlier policy was, of course, favoured by the limitations of epidemiological knowledge—the part played in infection by human, animal, or insect carriers was not realised, and there was little help from the laboratory.

New knowledge began to tell however, and in fact it was the repeated demonstration of the need for continued studies of the transmission of these pestilential diseases which led to the formation of the Office International d'Hygiène publique in Paris. Only by continuous expert study, and by recommendations agreed between the technical representatives of all the countries concerned, could the principles of the measures which should be taken and the obligations which Governments should jointly assume be fixed with any prospect of practical success. The proposal to establish an International Office for the purpose was made by that distinguished French diplomatist, happily still with us, M. Camille Barrère, as president of the Paris Conference of 1903. It took shape in 1907 in the agreement then made in Rome between 13 countries. The Bureau of the Office was established in Paris at 195, Boulevard St. Germain, and began its work in 1909, when the system of half-yearly meetings of the delegates was begun and has been followed from that beginning.

I will refer a little later to other work done by the Office, but to continue with the so-called pestilential diseases and quarantine questions, one may say here that the establishment of the Office at once justified itself when it became necessary again to revise the International Sanitary Convention in 1912, principally on account of the new situation created by the pushing forward of the Hedjaz railway, and the prospect at that time that the elaborate international system for preventing the recurrence of the spread of cholera by pilgrims returning from Mecca would have to be radically changed in consequence of this much-favoured Turkish project coming into operation. I note here in parentheses that this line has never been completed in Arabia, and it does not *at present constitute a practical factor in the sanitary* control of the Pilgrimage.

INTERNATIONAL CONTROL OVER THE ANNUAL PILGRIMAGE TO MECCA

Most of the conferences and conventions and a number of regional agreements have been concerned with the potential centre of distribution of cholera which is created when pilgrims from all parts of the Mohammedan world congregate during the days of the Haj at the several holy places of Arabia, and infection can readily be spread through their fouled and scanty water-supplies and otherwise. The range of the pilgrimage is surprising; it is made from Turkestan and the Caspian, from Northern and Western Africa, as well as from the nearby countries of the Levant. They meet there pilgrims from areas which are or have been endemic centres of cholera; many thousands from India, from Malaya, the Dutch East Indies, and even further afield. Some though not all of the classic cholera pandemics have thus had their origin. Between 1831 and 1912, as many as 27 years have been recorded in which epidemic cholera in connexion with the pilgrimage occurred on a larger or smaller scale. The notable English cholera epidemics of 1865–66 represented an extension from infection at Mecca in the first of these years[3]; the most formidable extension of cholera by the pilgrimage occurred in 1893.

After the interruption of the war years the pilgrimage reverted to its former size, and exceeded 100,000 in 1927. Since then, however, various causes, chiefly economic, have greatly reduced the annual figures, but the reduction may well be temporary. In any event the international arrangements to check the spread of infection must be maintained and made to respond to modern possibilities. The different phases of the elaborate international coöperation for this purpose are excellently set out by Dr. Duguet, Inspector-General of the Quarantine Board of Egypt, in his recent volume, "La Pélerinage de la Mecque" (Riever, Paris, 1932). Here it will suffice to note that the present system comprises: (*a*) provision for inspection of pilgrims before departure, and their vaccination against cholera; (*b*) detailed sanitary regulations applying to all pilgrim ships; (*c*) for ships coming to the Red Sea from the south, inspection at Kamaran, an island with a well-equipped sanitary station, now maintained by agreement (1926) between the Governments of British India and the Dutch East Indies; (*d*) for pilgrims coming by land routes sanitary passports and intercommunication between the authorities concerned, so as to regulate and minimise the repetition of medical measures taken at successive frontiers; (*e*) for pilgrims returning northward, examination at the quarantine station at El Tor, on the Sinai peninsula.

Considering the number of different nations and authorities which are concerned, the present system works surprisingly well and is achieving its main purpose. Since the International Sanitary Convention of 1926 it has come under annual survey by the Paris Office and its standing Pilgrimage Commission.

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[3] See also "Papers concerning the European Relations of Asiatic Cholera," by Dr. Netten Radcliffe and others; Report to the Medical Officer of the Privy Council and Local Government Board. New Series. No. V., 1875."

A MENTAL RECOVERY-RATE.—Dr. F. G. Jones, medical superintendent of the North Wales Mental Hospital at Denbigh, in his annual report states that the average recovery-rate among patients for the last 20 years was over 40 per cent., as compared with a mean rate throughout the mental hospitals in England and Wales of about 32 per cent. The death-rate was 4·2 per cent. on the average number resident—the lowest rate on record.

THE THERAPEUTIC ACTION OF PROSTIGMIN[*]

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IN 1931 Aeschlimann and Reinert[1] published a report on the pharmacological action of some analogues of physostigmine and showed that the dimethylcarbamic ester of 3-oxyphenyl-trimethyl-ammonium-methyl sulphate is as active as physostigmine in stimulating intestinal peristalsis, but that its effect on the heart and circulation is less. This substance is known as Prostigmin and is recommended for therapeutic use as an intestinal stimulant when given by subcutaneous, intramuscular, or intravenous injection, especially in cases of post-operative intestinal atony. Following favourable reports on its therapeutic value by Weigand,[2] Leiner,[3] and Tourneux, Petel, and Gouzi,[4] and a study of its action on the intestinal tract by means of X ray examinations by Kottlors,[5] many accounts of the beneficial effect of this substance in intestinal atony have been published, but so far no reports on its value have appeared in this country.

The action of prostigmin has been observed in 41 patients. It was administered by subcutaneous or intramuscular injection of the solution provided in ampoules by the manufacturers. Thirteen of the patients were selected from among ordinary hospital in-patients not because the action claimed by the manufacturers was desired, but because they presented no special lesion of the digestive tract that would interfere with observations on the action of the drug under approximately normal conditions. In 28 instances patients were selected because the action claimed was desired, and in 16 of these post-operative intestinal distension was present.

EFFECT UPON HEART-RATE AND BLOOD PRESSURE

In view of the close similarity in chemical constitution of prostigmin and physostigmine, observations on heart-rate and blood pressure were made for some minutes before and for 30 to 60 minutes following the subcutaneous injection of prostigmin in 10 patients. The doses used were:—

1 c.cm. = 0·0005 g.* in 2 cases.
2 ,, = 0·001 g. ,, 7 ,,
3 ,, = 0·0015 g. ,, 1 case.
and in one a second injection of 4 c.cm. = 0·002 g.

* This is the dose recommended.

In none of them was any significant change in heart-rate or blood pressure observed with doses of 1, 2, or 3 c.cm., nor was any discomfort produced other than that referable to an action on the digestive tract. As a rule, both heart-rate and blood pressure showed a slight but steady reduction during the periods of observation, but following 4 c.cm (0·002 g.), which was given on one occasion only, an average pulse-rate of 116 before injection was reduced to 84 half an hour after the injection, a greater fall than can easily be accounted for as the result of the loss of nervousness and anticipation. One patient showed slight sweating, and two others some twitching of the muscles of the limbs and trunk, but in none of these instances was discomfort produced, and it was not possible to say that these phenomena were the result of the prostigmin. Slight transient local discomfort was produced by the subcutaneous injection of the solution.

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[*] A Report to the Therapeutic Trials Committee of the Medical Research Council. The prostigmin used in these tests was manufactured by F. Hoffmann-La Roche and Co., A.-G., Basle, and submitted to the Committee by the Hoffmann-La Roche Chemical Works, Ltd., London.

EFFECTS REFERABLE TO ACTION ON DIGESTIVE TRACT

In all of the 13 patients, without any interference with intestinal action, a sensation of excessive activity and movement was experienced in the abdomen, variously described as "rumbling," "wind," "gurgling," "griping pains." This usually commenced in 10 to 20 minutes after the injection and lasted for a varying period of time from one or two minutes up to an hour. When well marked it increased for some minutes and was at a maximum 30 to 40 minutes after the injection and then gradually lessened in intensity. Most of the patients passed some wind by the rectum and two asked for the bed-pan, one at 15 minutes and one at 30 minutes after the injection, but did not defæcate and the desire to do so rapidly passed off. In three instances nausea was experienced following 2 c.cm. (0·001 g.), and vomiting occurred following the dose of 4 c.cm. (0·002 g.).

Three patients selected because of difficulty with the action of the bowels, but not post-operative distension, require more detailed consideration.

(*a*) A man, aged 20, with acute rheumatism and pericarditis, had had no action of the bowels for two days. He did not experience any sensations following the injection of 2 c.cm. (0·001 g.). A soap-and-water enema was given 3½ hours after the injection, and he had a large and satisfactory motion.

(*b*) A man, aged 65, with cerebral thrombosis and a right-sided hemiplegia, had much difficulty in opening his bowels. For two weeks he had no satisfactory result in spite of repeated enemata. Twenty-five minutes after the injection of 2 c.cm. (0·001 g.) he asked for the bed-pan and continued to use it for three-quarters of an hour, a very good evacuation resulting, but accompanied by severe griping pains, and he was much exhausted.

(*c*) A man, aged 28, suffering from incontinence of fæces following a crush fracture of the spine, had had no movement of the bowels for 21 hours. Thirty-five minutes after the injection of 2 c.cm. (0·001 g.) and following much rumbling in the abdomen he emptied his bowels in the bed. A further injection of 4 c.cm. (0·002 g.) was given a few days later; 28 minutes afterwards he had an involuntary evacuation of the bowels and a little later he vomited.

In an endeavour to determine more clearly the action of the drug causing the sensations of increased movement of the intestines recorded above but seldom resulting in an emptying of the bowels, (*a*) two patients with colostomy were observed, and (*b*) four patients were examined by X rays following barium meals.

(*a*) (1) Colostomy was performed on a man, aged 56, for inoperable carcinoma of the rectum, the opening being at the junction of the descending and sigmoid portions of the colon, and 11 days later he was given an injection of 2 c.cm. (0·001 g.). The sensations of abdominal unrest commenced in six minutes and increased for three-quarters of an hour, after which they gradually subsided. At times they amounted to pain. Small quantities of wind were passed at frequent intervals by the colostomy opening but no liquid or solid contents, and the exposed portion of the colon was seen to contract and relax from time to time, these movements coinciding with the passage of wind.

(2) A woman, aged 39, was suffering from acute obstruction due to megacolon and volvulus and a resection of the sigmoid colon was performed, with the formation of an artificial anus at the lower end of the descending colon. Fifteen days later she was given an injection of 2 c.cm. (0·001 g.). The sensations of abdominal activity commenced 13 minutes later and increased somewhat in intensity for a quarter of an hour and were still noticeable at the end of three-quarters of an hour. During this time small quantities of wind only were passed by the colostomy opening. The abdominal wall was very thin and patterns were observed as of contractions and distensions in the ascending and transverse colon, and the exposed portion of the colon was seen to contract and relax from time to time. At one time, about 30 minutes after the injection, a movement was seen through the abdominal wall as if a wave of contraction passed along the colon from the cæcum to the splenic flexure.

These observations were made two hours before the patients were due to have the daily washing-out of their colons, and when this was done fæcal material was returned as usual in both cases. It is of interest, therefore, that in spite of the manifest activity of movement in the colon wind only was passed.

(*b*) Three patients were given a barium meal six hours previously so that the colon was filled, and a second meal immediately before the injection of prostigmin; a fourth had the first meal only, as the stomach still contained enough at the end of six hours to enable the condition of the stomach to be observed. The patients were examined from time to time with the fluoroscopic screen during at least an hour following the injection. In two of the patients who received 1 c.cm. (0·0005 g.) no movements that could be regarded as abnormal were seen, although both had sensations of abdominal activity to a slight extent. The other two received 2 c.cm. (0·001 g.). In one of them at the end of three-quarters of an hour alternate contractions and relaxations were seen in the descending colon and continued for a quarter of an hour, a type of movement that is not usually observed in the colon during X ray examinations in subjects with normal intestinal tracts. The second patient showed similar movements in the transverse and descending colon for 10 minutes at the end of three-quarters of an hour after the injection, and one short wave of contraction was observed to pass along the transverse and descending colon. This type of movement also is not commonly seen in normal intestinal tracts.

In all four of these subjects active movements of the stomach and small intestine, consisting of contractions and relaxations and peristaltic waves, were observed, but it is not possible to say that they were abnormal.

POST-OPERATIVE CASES WITH DISTENSION

Prostigmin was given in 16 cases of abdominal distension following surgical operation.

CASE 1.—A man, aged 44, was operated on for carcinoma of the stomach and a partial gastrectomy performed. Three days after the operation signs of general peritonitis appeared with abdominal distension. On the following day the distension was increasing and no wind was passed. Fifteen minutes after the injection of 1 c.cm. (0·0005 g.) he asked for the bed-pan but without result, a turpentine enema was given but no wind or fæces were passed. A further injection of 1 c.cm. was given four hours later and a turpentine enema 20 minutes after it, and a little wind was passed. The patient died next day, and at autopsy general peritonitis was found.

CASE 2.—A woman, aged 74, was admitted suffering from acute intestinal obstruction, due to a carcinoma of the transverse colon. For this a cæcostomy was performed. The cæcostomy did not act well and the small intestine became greatly distended. Inserting a large tube into the cæcostomy produced little result. An injection of 1 c.cm. (0·0005 g.) produced within ten minutes a remarkable effect—very active movements were induced and several bowls were filled with fæcal content from the cæcostomy opening in the course of a few minutes. In this case a very effective small intestine propulsion was induced.

CASE 3.—A man aged 56. Investigation showed a scirrhous carcinoma of the stomach with secondary duodenal ileus from infiltration of the root of the mesentery. A duodeno-jejunostomy was performed. Three days later he was greatly trouble with flatulence which did not yield to flatus enemata. The injection of 1 c.cm. (0·0005 g.) produced almost immediately movements of the small intestine. He expressed the feeling that a movement commenced as high up as the stomach and passed progressively down the bowel. A small flatus enema now gave a very satisfactory result. The injection was repeated on a second occasion and the result was equally good.

CASE 4.—A woman, aged 50, suffered from carcinoma of the rectum. A preliminary colostomy was performed through the left rectus muscle. Owing to œdema and tight gripping of the muscle the colostomy did not act well. Even when a rubber tube was inserted little came away. The injection of 1 c.cm. (0·0005 g.) produced an immediate activity, and a further insertion of the tube resulted in an evacuation with relief. On a second occasion the result was similar.

CASE 5.—A man, aged 42, suffered from a gangrenous and perforated appendix with diffuse peritonitis. He developed abdominal distension with obstructive symptoms on the fifth day after operation. On three occasions he was given 1 c.cm. (0·0005 g.) followed by enemata, without satisfactory result. Jejunostomy was required, but a fatal result followed. In this case there was an organic obstruction from adhesions, and this explained the failure of prostigmin to produce an evacuation.

CASE 6.—A man, aged 40, had a gastro-jejunostomy performed for duodenal ulcer. He complained of flatulent distension on the second day. This was not relieved by a flatus enema. The injection of 1 c.cm. (0·0005 g.) produced activity, and an enema given ten minutes later produced a large and satisfactory passage of flatus. The patient asked to have the injection repeated on the following day, when the result was equally satisfactory.

CASE 7.—A man aged 21. Operation for chronic appendicitis with adhesions. Marked gaseous distension occurred on 3rd, 4th, and 5th days after operation. On two occasions 1 c.cm. (0·0005 g.) of prostigmin, followed by a small enema, produced the free passage of flatus. Later a third dose produced little result, and 1 c.cm. of pituitrin given two hours later was much more effective. On the following day prostigmin again produced little result, but pituitrin, given some hours later, was again effective. In this case prostigmin appeared to be less effective than pituitrin, but it is possible that the combination of the two drugs helped to produce the ultimately satisfactory result.

CASE 8.—A woman aged 66. Operated upon for chronic appendicitis with adhesions round the lower end of the ileum. The appendix was removed and the adhesions divided. On the second day after operation she became greatly distended and unable to pass flatus. An injection of 1 c.cm. (0·0005 g.) produced, within six minutes, considerable rumbling of gas with immediate relief, and an enema given some minutes later produced an excellent result. She was quite satisfied that after the injection and before the enema was given she got pronounced relief.

CASE 9.—A man, aged 32, was operated on for chronic appendicitis. Numerous adhesions had to be divided and considerable handling of the small intestine took place. On the evening of the second day following operation he complained bitterly of flatulent distension. A flatus enema gave slight relief, but his discomfort quickly returned. He was given 2 c.cm. (0·001 g.) of prostigmin. Twelve minutes later he had griping pains and much rumbling, but no passage of flatus. This continued for 15 minutes. He was then given a flatus enema with a very satisfactory result.

CASE 10.—A man aged 26. Marked abdominal distension and vomiting occurring three days after an operation for the relief of acute obstruction due to adhesions. 1 c.cm. (0·0005 g.), by intramuscular injection, followed by a 10 per cent. glycerin enema produced a satisfactory evacuation of flatus and fæces. On the following day some distension which occurred was again relieved by repetition of the treatment.

CASE 11.—A girl aged 7. Abdominal distension and vomiting occurred two days after operation for appendix abscess. An ordinary enema gave no relief. The injection of 0·5 c.cm. (0·00025 g.) intramuscularly, followed by a glycerin enema, produced no beneficial result. Four hours later 1 c.cm. (0·0005 g.) was given and followed by a glycerin enema. Following this a free action of the bowels took place and the patient gave no cause for further anxiety.

CASE 12.—A man aged 22. Marked abdominal distension and vomiting occurring three days after operation for gangrenous appendicitis with peritonitis. Intramuscular injection of 1 c.cm. (0·0005 g.), followed by a glycerin enema, failed to produce any beneficial result. This was repeated in four hours and again failed to produce any change in the condition, except some increase in the abdominal discomfort. A satisfactory evacuation resulted some hours later, and after the administration of acetylcholine.

CASE 13.—A youth aged 18. Acute abdominal discomfort with distension occurring two days after operation for appendix abscess with local peritonitis. Intramuscular injection of 1 c.cm. (0·0005 g.), followed by a glycerin enema, produced a satisfactory result in that the bowels acted well and the discomfort disappeared.

CASE 14.—A man aged 20. Mild distension and colicky abdominal pain on the day following operation for acute appendicitis. A good action of the bowels with disappearance of the symptoms followed the intramuscular injection of 1 c.cm. (0·0005 g.) and a glycerin enema.

CASE 15.—A man aged 21. Severe intestinal colic on the day following an operation for acute appendicitis with local peritonitis. Intramuscular injection of 1 c.cm. (0·0005 g.), followed by a glycerin enema, failed to give any relief. This was repeated four hours later and was followed by the passage of flatus and fæces with complete relief of the symptoms.

CASE 16.—A woman aged 34. Marked abdominal distension with vomiting and colicky abdominal pain three days after operation for acute appendicitis with peritonitis. Intramuscular injection of 1 c.cm. (0·0005 g.), followed by a glycerin enema, resulted in the passage of flatus and fæces. Owing to a recurrence of the symptoms this was repeated on the following day with a satisfactory result.

POST-OPERATIVE CASES WITHOUT DISTENSION

In nine cases prostigmin was given after operation not associated with distension. An injection (intramuscular) of 1 c.cm. (0·0005 g.), followed by a glycerin enema, was given to each of four men between the ages of 18 and 22 years, who were suffering from mild abdominal discomfort on the day following operation for acute appendicitis. In two a satisfactory evacuation of the bowels took place with relief from the discomfort. In the other two no action of the bowels was obtained, and the discomfort was slightly increased. A normal recovery occurred in each instance.

An injection (intramuscular) of 1 c.cm. (0·0005 g.), followed by a glycerin enema, was given to each of five men, between the ages of 18 and 43 years, on the day following operation for inguinal hernia. In three a satisfactory evacuation of the bowels occurred, but in the other two no action resulted until after an aperient was given on the following day.

Conclusions

1. The injection, subcutaneous or intramuscular, of prostigmin produces in normal subjects active movements (contractions and relaxations) in the colon, but there is no evidence that these movements are such as to produce the forward passage of the contents of the colon. Considerable variation was seen in the intensity of the response of different individuals.

2. Prostigmin appears to be free from side-actions on the heart-rate and blood pressure when given in doses at least double the recommended dose.

3. In cases of gaseous distension of the intestine, prostigmin is of value. In from 10 to 20 minutes following its injection abdominal pains and rumblings occur, and these go on for almost 30 minutes. It is necessary to give an enema to get a satisfactory passage of flatus.

4. It is suggested that prostigmin, followed by pituitrin, and then an enema, may be an effective measure for stimulating peristalsis in post-operative distension.

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ACUTE PERFORATION OF PEPTIC ULCERS

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This survey presents some features of 75 cases of perforated gastric and duodenal ulcers operated on by us—with special reference to the incidence, the diagnosis, and the immediate complications. There were 63 males and 12 females. The distribution is shown in Table I.

Table I

—	—	Duodenal.	Gastric.		
			Pyloric.	Mid-gastric.	High gastric.
Males ..	63	48	6	5	4
Females ..	12	4	1	6	1

Although males outnumber females by more than five to one, the proportion of females is rather higher than usual. There is an overwhelming preponderance of duodenal perforations in the male, while in the female the perforation of gastric ulcer has been twice as frequent as that of duodenal ulcer.

In the gastric perforations the ulcer was found on the anterior surface of the stomach—at or close to the lesser curve—in all but one, where the perforation occurred into the lesser sac from an ulcer high up on the posterior aspect of the stomach near the cardiac orifice. In all the duodenal cases the perforation was found on the anterior surface of the first part.

AGE AND PREVIOUS HISTORY

Half of the perforations in this series occurred in the fifth and sixth decades, the fifth decade being found the commonest for both gastric and duodenal ulcers in both sexes. The oldest patient was a woman of 74, and the youngest a man of 19. Twelve patients had no previous symptoms, while in 11 indigestion had been present for a period under four weeks. In the remainder there was a history of digestive disturbance ranging from a few months to over twenty years. The proportion of patients with no previous symptoms is higher than that usually recorded. It is worthy of note that nearly all these cases were duodenal perforations, and the importance of bearing in mind this frequency is evident from the diagnostic point of view. Three patients gave a history of hæmatemesis twelve, nine, and four months respectively prior to perforation, while one patient returned twelve months later with a second perforation at the site of the original ulcer—having been free from symptoms in the interval. In five patients the onset of perforation was heralded by an exacerbation of digestive symptoms for several days before. This feature has been stressed by many observers, and especially by Moynihan.[1] It is strange, however, that this is not a more common event, for in nearly all cases the perforation is due to a progressive necrosis in the floor of a chronic ulcer. In all our cases perforation occurred at the site of a chronic ulcer, evidence of chronicity being found even when there was complete absence of previous digestive disturbance.

A search for any immediate cause of perforation led to no very definite conclusion. Some occurred during active work, others while the patient slept. The majority of our perforations occurred an hour or two after food. It is probable that some increase in gastric tension is the commonest precipitating factor; 11 of our cases followed a festive Christmas meal. In one the perforation of a duodenal ulcer appeared to be precipitated by a copious hæmatemesis—several bouts of vomiting being followed by the onset of acute pain and all the signs and symptoms of perforation.

TYPES OF PERFORATION

These were found to fall into three groups.

Group 1.—In the great majority the opening was of moderate size, round and punched out, about an eighth of an inch in diameter, through which duodenal or gastric contents had escaped in varying quantity. It is common experience that in duodenal perforations there is but little escape of gastric contents—probably from spasmodic closure of the pylorus.

Group 2.—The perforation was larger. The stomach was the common site of these bigger perforations, and the gross soiling of the peritoneum carried a correspondingly grave prognosis.

Group 3.—The opening was minute and partially or completely covered with lymph. Six cases fell into this group. They appear to be comparatively frequent, and usually occur when the stomach is empty and the small hole is rapidly covered by protective lymph. Moynihan[2] has long ago drawn attention to the importance of this group and the difficulties attaching to the diagnosis. The initial signs and symptoms of perforation rapidly abate and with suitable treatment complete healing may occur without operation. This occurred in one of our cases. In another a localised epigastric abscess developed. In a third case the barrier formed by the protective layer of lymph gave way after a period of 48 hours—with a return of the typical features—necessitating the usual operative measures.

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[1] Practitioner, 1928, cxx., 138.
[2] Ann. Surg., 1907, xlv., 223.

Although perforation occurred most frequently after a meal, it was uncommon to find gross soiling of the peritoneum by food except in the gastric perforations. Multiple areas of fat necrosis in the omentum and subperitoneal fatty tissue were found in one case of duodenal ulcer—the perforation being near the junction of the first and second parts.

An attempt was made to estimate the acidity and peptic activity of the gastric juice obtained by means of a fine catheter inserted through the opening. The frequency of bile or food contamination, however, precluded any definite results being obtained.

DIAGNOSIS

The majority presented the characteristic features—sudden prostration by agonising abdominal pain, followed by tense immobility and a board-like tender abdomen. It is not proposed to elaborate all the details of such a well-known picture, but certain features are worthy of comment. A few patients presented a degree of activity that was surprising; one patient a hardy gipsy woman, with a perforation of one hour's duration, was able to walk a distance of one mile to hospital. Vomiting at the onset was present in about a third of our cases, but was not of any severity, while the pulse-rate was but little raised in the early stages except in elderly patients. Only five cases presented shoulder pain as a symptom. Absence of liver dullness was noted in 11 cases, two of these being of less than six hours' duration.

Difficulties in diagnosis do not usually arise in the majority of cases seen reasonably early, except in those falling into the third group. In these the initial general signs and symptoms quickly abate and become localised, simulating acute cholecystitis, acute appendicitis, or acute affections of the chest. The temperature is subnormal at the onset in nearly all perforations, thus affording a useful differential feature. Auscultation of the abdomen has been found of great value in the obscure case, for as a rule there was complete absence of peristaltic sounds, while in acute chest conditions they were never absent.

The demonstration of pneumoperitoneum is a diagnostic aid of very great value in a doubtful case. We have resorted to this method of diagnosis in one of our series where a small perforation of the duodenum covered with lymph was associated with chest signs which clouded the diagnostic picture. The skiagram—taken with a portable apparatus while the patient was in the Fowler position—revealed the typical sickle-shaped areas of free gas under the diaphragm, making the diagnosis obvious. The procedure can be carried out with little or no discomfort to the patient.

TREATMENT AND FATALITY

Simple closure, with reinforcement of the suture line by omentum, was performed in all cases with the exception of one where gastro-enterostomy was added. This was a case in which a perforation of the duodenum had recurred at the site of the original ulcer twelve months later. A right paramedian incision under general anæsthesia was employed in most cases, but where the general state of the patient was poor a median incision allowed a more rapid opening and closure of the abdomen. Spinal and local anæsthesia were found eminently satisfactory in suitable cases. Where the stomach contained food it was emptied by an œsophageal tube passed by the mouth during the operation. Strict abdominal toilet was employed only in gastric perforations where particles of food were found in the peritoneal cavity. Pelvic drainage was employed if the perforation had been in existence over twelve hours. The fatality was as follows:—

TABLE II

	Patients.	Deaths.	Fatality-rate per cent.
Duodenal ulcer ..	52	9	17
Gastric ulcer ..	23	9	39
Total	75	18	24

The higher fatality with perforated gastric ulcers is the experience of most surgeons. It is due, in all probability, to the greater soiling of the abdomen, especially if the opening is a large one, with a more rapidly oncoming peritonitis than that met with in perforations of the duodenum.

The fatal cases were found to fall into the following groups:—

1. Those dying within 48 hours of operation (5 cases). In these patients there was no improvement after the operation. They came to hospital late, with the general condition severely undermined; in one case advanced carcinoma of the cervix coexisted. In this group death was due to peritonitis.

2. Those dying between the third and the ninth day after operation (8 cases); following peritonitis (3); peritonitis and delirium tremens (1); broncho-pneumonia (2); broncho-pneumonia and parotitis (1); pulmonary embolism (1). As in the preceding group the main determining factors leading to a fatal issue were the time elapsing before treatment was instituted, the age of the patient, and the site of the perforation. The fatality rose to 100 per cent. in acute perforations of over 24 hours' duration. The death-rate rose with each decade, and the tendency of the elderly to succumb to pulmonary complications was illustrated by three deaths from broncho-pneumonia. Parotitis is now a rare complication, but may occur even when all precautions are taken.

3. Deaths occurring between 10 and 28 days (5 cases); following subphrenic abscess (1); residual pelvic abscess with intestinal obstruction (1); pneumonia (1); and hæmatemesis from an unsuspected ulcer (2).

Our cases illustrated that subphrenic and pelvic abscesses are the result of delay. Intestinal obstruction has been met with on two occasions and occurred around the site of the drainage-tube necessitated by gross peritoneal soiling.

The occurrence of hæmorrhage from a second ulcer led to a fatal termination in two cases, on the tenth and twenty-fourth post-operative day respectively. In each case the perforation had occurred in the duodenum, and the bleeding was shown at autopsy to have its origin in an unsuspected gastric ulcer—in one case eroding the splenic artery. The possibility of this occurrence indicates the desirability of searching for other ulcers at the time of operation and stresses the need for prolonged and thorough after-treatment.

It is often stated that bleeding ulcers do not perforate, and that perforating ulcers do not bleed, but we have seen this association in two cases. In one the perforation followed immediately upon a hæmatemesis, and in another profuse bleeding occurred from an ulcer high upon the lesser curve which had been sutured ten days before.

DIABETES MELLITUS IN CHILDREN

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This paper is based on observations on 18 patients with diabetes mellitus who attended Addenbrooke's Hospital between 1925 and 1933, and who at the time of onset were less than fifteen years old. In 5 the disease began before 1927, and until that year their treatment with insulin was intermittent and insufficient. All the 16 who survive have been under regular supervision from 1927 until the present time. The cases are unselected, and comprise all the diabetic children attending between 1927 and 1933.

Three of these children live in Cambridge and the remainder in the country or in villages and small towns between ten and fifty miles distant. As a rule it is impossible for them to attend hospital more often than once every two months for supervision. Many of them also live at considerable distances from their doctors, and in the event of complications developing treatment is often delayed. They are mostly drawn from an illiterate class, and although they themselves are usually of the more intelligent, it is difficult with the present organisation to teach them more than a few essential facts about the management of their disease.

CASE RECORDS

The following is a brief outline of the cases as reviewed up to October 1933. Under the heading of severity are given the results of a sugar-tolerance test with the fasting blood-sugar (per cent.) and the blood-sugar at half-hourly intervals after ingestion of a stated quantity of glucose. F.B.S. = fasting blood-sugar. C. = carbohydrate. P. = protein. F. = fat. (Hagedorn-Jensen mèthod throughout.)

Case 1.—*A girl now aged 15.* Chicken-pox at 4. When she was 7 years old (August 1925) her mother noticed that she was losing weight, was thirsty and passed much urine. Next month she was admitted to hospital, when the findings were: urine sugar, 5 per cent.; acetone and diacetic acid in large amounts; blood-sugar 0·24 per cent.; weight, 2 st. 12 lb. *Severity of disease* (November 1931). Sugar tolerance: F.B.S. (fasting blood-sugar) 0·28; (50 g. glucose) 0·36, 0·42, 0·46, 0·38; specimens of urine passed after one hour and three hours contained 22·8 g. glucose in all. *Present treatment.* Diet: total calories, 1884; calories per kg., 46; C. (carbohydrate) 150, P. (protein) 60, F. (fat) 110. Insulin: 25 units bis die. *Present condition.* Usual resting blood-sugar: 0·1. Usual urine findings: sugar-free. Weight: 6 st. 6 lb. Height: 5 ft. 1 in. Sexual development normal; no menstruation. Activity normal.

Case 2.—Male aged 21. In June 1925 he had mumps. There was no abdominal pain but it was followed by epigastric discomfort. A few weeks later thirst and polyuria developed, and in September sugar was discovered in the urine. He was then 12½ years old. *Severity and course of illness.* On admission to hospital (September 1925) large amounts of sugar and acetone bodies were present in the urine. Resting blood-sugar 0·28. Passed 113 g. of glucose on a restricted carbohydrate diet in 24 hours. Two days later was on the verge of coma. Weight: 4 st. 13 lb. For the first two years he was treated with a very low diet and insulin for a few weeks. During the next 18 months he had insulin, but not enough. The disease was then controlled and sufficient insulin given. Sugar-tolerance curve (January 1932): F.B.S., 0·28; (50 g. glucose) 0·40, 0·44, 0·43, 0·39, 0·39; urine specimens at the end of one hour and three hours contained 41·4 g. glucose. *Present treatment.* Diet: total calories, 1668; calories per kg., 25; C. 110, P. 70, F. 100. Insulin: 40 units b.d. *Present condition.* Usual resting blood-sugar: 0·10–0·18. Usual urine findings: sugar-free about every other visit. Weight: 11 st. 10 lb. Height: 5 ft. 11¾in. Sexual development normal. Activity normal; looks after a chicken farm and does a great deal of manual work.

Case 3.—Boy aged 14½. Always delicate and inclined to lose weight; mumps as a child. One brother died of diabetes at 25. In March 1932 he developed sudden thirst and polyuria and lost a lot of weight. After three days he was put on a small dose of insulin, about 100 units a week, given at irregular intervals. He remained weak, often too weak to get out of bed. *Severity.* Attended hospital for the first time in March 1933. Urine sp. gr., 1040; sugar and acetone bodies in large amounts; resting blood-sugar 0·27. Hypoglycæmic coma: one attack, with convulsions in August 1933: (had not taken breakfast). *Present treatment.* Diet: total calories, 1668; calories per kg., 41; C. 120, P. 60, F. 100. Insulin: 24 units b.d. *Present condition.* Resting blood-sugar, very variable and often high. Usually glycosuria. Weight: 6 st. 4 lb. Height: 4 ft. 10 in. Sexual development: penis infantile in type but just beginning to develop; only a few pubic hairs. Activity normal.

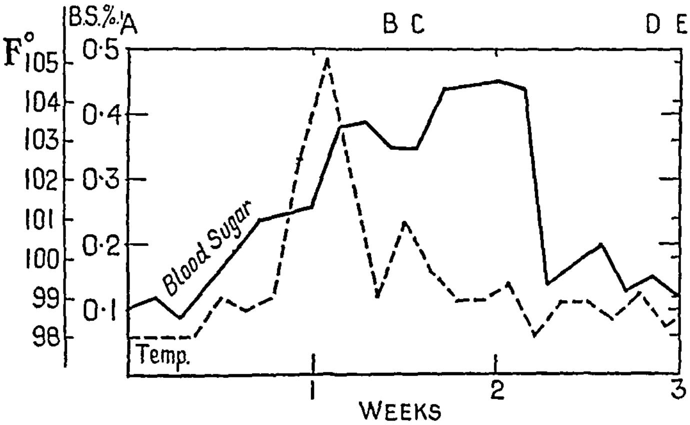
Case 4.—Boy aged 13½. Whooping-cough in 1921: vaccinated in 1925, *after which the arm did not heal* well and was bad for eight weeks. In December 1926 when he was 7 years old, he had "influenza," followed by mumps; this was a mild attack but there was some abdominal pain which lasted for over a week. Three weeks later he suddenly developed thirst, hunger, and polyuria and began to waste. (Weight in December 1926 4 st. 7 lb.) *Severity and course of illness.* On admission to hospital in March 1927 the urine (sp. gr. 1038) contained large amounts of sugar and acetone bodies. Resting blood-sugar 0·17; weight 3 st. 4 lb. The condition was only partially controlled by a very low diet and occasional insulin until March 1930, when weight was 4 st. 1½ lb. Adequate diet and sufficient insulin were then begun. Diabetic coma: March 1930 (insulin stopped); and August 1930 (empyema of maxillary antrum), although insulin 20 b.d. had been continued. Sugar-tolerance test (August 1931): F.B.S., 0·40; (50 g. glucose) 0·54, 0·56, 0·58, 0·56, 0·48. Specimens of urine at the end of one and three hours contained 36 g. glucose in all. *Present treatment.* Diet: total calories, 1550; calories per kg. 38; C. 80, P. 60, F. 105. Insulin: 25 units b.d. *Present condition.* Usual resting blood-sugar: 0·1; occasional relapses to 0·2. Usual urine findings: trace of sugar; occasional severe relapses. Weight: 6 st. 6 lb. Height: 4 ft. 8 in. Sexual development: penis still infantile; no pubic hair. Activity: Plays all games including football and swimming; top of his class and sings in college choir.

Case 5.—Girl aged 16¾. One brother died four years ago, aged 18. He was perfectly well until a few weeks before death; he then seemed out of sorts, and a few days of polyuria and thirst preceded coma. He was never admitted to hospital and received no insulin. The patient herself had a bad cold in July 1931 when she was 14¾ years old, and in the following month she developed wasting, lassitude and loss of weight, followed by thirst and polyuria of sudden onset. *Severity.* On admission to hospital in September 1931 the urine (sp. gr. 1040) contained sugar and acetone bodies in large amounts. Resting blood-sugar, 0·3. Weight 6 st. Mild attack of hypoglycæmic coma in November 1932. *Present treatment.* Diet: total calories, 1380; calories per kg., 26; C. 100, P. 55, F. 80. Insulin: 30 units b.d. *Present condition.* Usual resting blood-sugar: 0·1–0·3. Sugar always present in urine. Weight: 8 st. 6 lb. Height: 5 ft. 2 in. Sexual development: normal. The periods began in January 1931 and stopped at the onset of the diabetes: they were irregular in 1932 but regular in 1933. Activity normal.

Case 6.—Girl aged 17. Five years ago (October 1928); she suddenly complained of thirst and polyuria and began to lose weight. *Severity and course of illness.* In November 1928 the urine (sp. gr. 1038) contained much sugar and acetone, and the weight was 4 st. 12 lb. Septic

tonsils enucleated in November 1931, after diabetic coma (insulin stopped during infection). Sugar tolerance (April 1932): F.B.S., 0·4; (50 g. glucose) 0·48, 0·51, 0·51, 0·48; specimens passed after one and two hours contained 21 g. glucose. *Present treatment.* Diet: total calories, 1628; calories per kg., 28; C. 105, P. 54, F. 105. Insulin: 40 units b.d. *Present condition.* Usual resting blood-sugar: 0·15–0·25. Sugar present in urine as a rule. Weight: 9 st. 2 lb. Height: 5 ft. 1 in. Sexual development: normal, but no menstruation. Activity normal.

CASE 7.—Boy aged 10½. On Feb. 8th, 1933, he complained of thirst for a few weeks; he then scalded his foot and four days later was admitted to hospital on the verge of coma. *Severity.* On admission the blood-sugar was 0·38 and the urine contained much sugar and acetone bodies. Sugar tolerance: F.B.S., 0·23; (25 g. glucose) 0·22, 0·29, 0·33, 0·35, 0·23; urine passed one and three hours after glucose contained 16 g. glucose in all. *Present treatment.* Diet: total calories, 1810; calories per kg., 60; C. 200, P. 60, F. 80. Insulin: 10 units b.d. *Present condition.* Usual resting blood-sugar: 0·1. Urine usually contains a trace of sugar; relapses. Weight: 4 st. 11 lb. Height: 4 ft. 6½ in. Activity normal.



Case 13—Blood-sugar (per cent.) and temperature readings during an attack of bronchitis. A.–B., insulin 18 units b.d.; B.–C., 20 units b.d.; C.–D., 25 units b.d.; D.–E., 20 units b.d. Diet: diminution of usual diet during fever.

CASE 8.—Boy aged 9½. When he was 6 years old, in the summer of 1930, he developed thirst and polyuria, lost weight and became progressively more ill. In February 1931 he had an attack of "influenza" and in March sugar was found in urine. *Severity and course of illness.* On admission to hospital in March 1931 the urine contained sugar and acetone bodies; resting blood-sugar, 0·15. Sugar-tolerance curve: F.B.S., 0·15; (50 g. glucose) 0·18, 0·26, 0·31, 0·30, 0·25. Weight: 2 st. 9 lb. May 1931: hypoglycæmic coma; unconscious for three hours; sickness and convulsions. November 1931: convulsions and coma. *Present treatment.* Diet: total calories, 2060; calories per kg., 82; C. 160, P. 72, F. 120. Insulin: 11 units b.d. *Present condition.* Usual resting blood-sugar: 0·08–0·14. Urine usually sugar-free. Weight: 4 st. Height: 4 ft. 2 in. Activity normal.

CASE 9.—Girl aged 11. In January 1930, at age of 7½, she began to lose weight and did not seem fit. A few days later slight frequency developed and sugar was found in the urine. Ten units of insulin daily were given by her private doctor till she was admitted to hospital in the following April. *Severity and course of illness.* On admission the resting blood-sugar was 0·25 and the urine contained a large amount of sugar and acetone. Sugar tolerance (September 1931): F.B.S., 0·2; (50 g. glucose) 0·36, 0·47, 0·50, 0·51. Weight: 3 st. 3½ lb. In November 1931 she had hypoglycæmic coma; unconscious for four hours; no warning. In 1932 on two occasions she was unconscious for about two hours. A peculiar scream preceded these attacks. No treatment was given. *Present treatment.* Diet: total calories, 1640; calories per kg., 50; C. 102, P. 60, F. 105. Insulin: 20 units b.d. *Present condition.* Usual resting blood-sugar: 0·04–0·12. Usually sugar-free. Weight: 5 st. 3 lb. Height: 4 ft. 4½ in. Activity normal.

CASE 10.—Girl aged 18. Whooping-cough and chickenpox as an infant. One brother has diabetes and congenital heart disease (Case 11). When she was 11 years old (July 1926) she was noticed to be blinking her eyes in a curious way. Before this her eyesight had been good and she had won a prize at school. Thirst and polyuria came on a few weeks later, and sugar was found in urine. *Severity.* (January 1927). Blood-sugar, 0·2. Passing 35 g. of sugar on diet of 100 g. carbohydrate. Weight: 3 st. 11 lb. Sugar tolerance (August 1931): F.B.S., 0·27; (50 g. glucose) 0·36, 0·41, 0·44, 0·41, 0·36, 0·3; specimens at end of one, two, and three hours contained 33·8 g. glucose. *Treatment and course of illness.* January 1927: C. 22, P. 86, F. 157. Insulin: 8 units b.d. August 1929: C. 36, P. 86, F. 157; 10 units b.d. increasing to 14. August 1931: C. 85, P. 60, F. 120; 22 and 25 units b.d. April 1932: C. 130, P. 60, F. 100; 22 and 25 units b.d. *Vision* (1927): right eye 6/60, left 24/60; (1933) right eye 6/60, left 6/60. Cataract. *Present treatment.* Diet: total calories, 1709; calories per kg., 40; C. 130, P. 60, F. 100. Insulin: 23 and 25 b.d. *Present condition.* Usual resting blood-sugar: 0·05–0·13. Usually sugar-free. Weight: 6 st. 11 lb. Height: 5 ft. 2½ in. Sexual development normal; no menstruation. Cataracts have progressed slowly since onset and are now being treated surgically. Activity normal.

CASE 11.—Boy aged 15½. Always a "blue" child from birth and known to suffer from a congenital heart. One sister two years older has severe diabetes and cataract (Case 10). One aunt on father's side had diabetes. At age of 9 (May 1927) he lost weight and began to suffer from thirst and polyuria; his urine was then found to contain sugar. *Severity* (January 1928). Resting blood-sugar, 0·22. Sugar tolerance (August 1931): F.B.S., 0·2; (50 g. glucose) 0·36, 0·45, 0·49, 0·50, 0·43. Loud systolic murmur and thrill over præcordium; extreme cyanosis with gross clubbing of fingers and toes; right ventricular preponderance in electrocardiogram. Red cell count 9,800,000 per c.mm. Weight: 3 st. 2 lb. *Present treatment.* Diet: total calories, 1277; calories per kg., 44; C. 90, P. 40, F. 80. Insulin: 8 units b.d. *Present condition.* Usual resting blood-sugar, 0·18–0·2. Usual urine findings: sp. gr. 1010–12; rarely a faint trace of sugar. Weight: 4 st. 9 lb. Height: 4 ft. 6½ in. Activity: physical activity very limited because of heart; intelligent and fond of reading.

CASE 12.—Girl aged 7. One uncle died of pulmonary tuberculosis. In October 1929, at age of 3½, she began to pass water frequently and became pale and out of sorts. Her urine was then examined and found to contain sugar and acetone. *Severity.* On admission to hospital in November 1929 the urine (sp. gr. 1050) contained much sugar and acetone. The resting blood-sugar was 0·26, and the weight 1 st. 11 lb. She passed 22·8 g. glucose in 24 hours. Sugar tolerance (November 1931): F.B.S., 0·27; (40 g. glucose) 0·4, 0·46, 0·52, 0·58. Mild attack of hypoglycæmic coma in October 1931. *Present treatment.* Diet: total calories, 1813; calories per kg., 86; C. 110, P. 60, F. 120. Insulin: 12 units b.d. *Present condition.* Usual resting blood-sugar: 0·03–0·09. Usually sugar-free. Weight: 3 st. 5 lb. Height: 3 ft. 8 in. Activity normal.

CASE 13.—Diabetes came on when the patient, a girl, was 4 years old; she died at 5½. *Mode of onset.* In February 1931 she was off colour for several weeks. At the beginning of March she had a feverish cold and her doctor found sugar in the urine. On the following day she became drowsy and gradually comatose and was admitted to hospital in coma. *Severity and course of illness.* Urine: sp. gr. 1010; sugar and acetone in large amount. Blood-sugar 0·49. Comatose. Colon distended with fæces. Tonsils large and septic. Weight: 1 st. 13 lb. After recovery from coma and a period of treatment the tonsils were enucleated in April. Her blood-sugar readings were extremely unstable and glycosuria was very difficult to control even on 55 units of insulin daily given in three doses. In spite of this she remained very well. Discharged on C. 80, P. 34, F. 50, and 40 units insulin daily in two doses. On this the blood-sugar readings remained unstable and glycosuria was often considerable. She also had mild attacks of hypoglycæmia. In January 1932 she was readmitted. Her sugar tolerance was as follows: F.B.S., 0·37; (40 g. glucose) 0·39, 0·51, 0·57, 0·62, 0·57. She was given a larger diet with less insulin: C. 110, P. 60, F. 50; calories, 1162; calories per kg., 64; and 18 units b.d. Weight: 2 st. 12 lb. While an in-patient she contracted bronchitis which demonstrated how severe was her reaction to infection (see Figure). She was discharged in March 1932 and remained well with a more stable blood-sugar for a few months. In August she developed a cold and became drowsy. Her insulin was then stopped and she was finally admitted to hospital almost moribund.

CASE 14.—This patient was a boy who developed acute diabetes at the age of 13 and died. As a child he had had an operation for inguinal hernia. Five weeks before his death he contracted mumps. The attack was not severe and he did not complain of any abdominal symptoms. After the attack he did not seem very well. Three days before admission to hospital he suddenly became very thirsty, passed large quantities of urine, and could not sleep. On admission he was comatose and extremely dehydrated. He smelt strongly of acetone and his urine was full of sugar and acetone. Blood-sugar 0·65. He died ten hours later despite administration of 190 units of insulin, rectal and subcutaneous salines, and intravenous infusion.

CASE 15.—The patient, a girl, has had diabetes for about 7 years, and is now 21. She was admitted to hospital in February 1926, at the age of 13¼, with a three weeks' history of thirst and polyuria. *Severity and course of illness.* The blood-sugar on admission was 0·38. She was starved for three days and became sugar-free, remaining sugar-free on Graham's twelfth-day diet. The blood-sugar came down to 0·07. She was discharged on this diet. Weight: 7 st. No insulin given. She remained sugar-free on this diet until October 1928. There was then a return of thirst and polyuria, due probably to a dental abscess. Blood-sugar 0·3; weight: 7 st. 7 lb. She was readmitted, her teeth were treated and she was standardised on 10 units b.d. and seven lines (C. 35, P. 52, F. 105). She was again readmitted in May 1932 for restandardisation. Diet was increased to C. 115, P. 60, F. 120, with insulin 16 units b.d. Weight: 9 st. 6 lb. *Present treatment.* Diet: total calories, 1833; calories per kg., 30; C. 115, P. 60, F. 120. Insulin: 20 and 16 units. *Present condition.* Usual resting blood-sugar below 0·1; occasional higher readings. Usually sugar-free. Weight: 9 st. 8 lb. Height: 5 ft. 6½ in. Sexual development normal; no menstrual periods till May 1932; three since. Activity: lives a normal life at home; plays tennis. On the whole she has not felt quite so well since her diet was increased in 1932. She is introspective about her health and gets worried if she finds a trace of sugar in the urine.

CASE 16.—Boy aged 15. Scarlet fever at 5. Two cousins on father's side have diabetes; one, a boy of 19, since the age of 15 and the other, a girl of 16, since the age of 7; both take insulin. In January 1932, when he was 13¾, he complained of three weeks' thirst, hunger, and frequency of micturition with sudden onset; no wasting. *Severity and course of illness.* On admission (February 1932) he had sugar in urine but no acetone. Resting blood-sugar, 0·14. Sugar tolerance: F.B.S., 0·14: (50 g. glucose) 0·14, 0·18, 0·23, 0·24, 0·19: urine specimens at one hour and three hours contained 8·9 g. glucose in all. In March 1932 he was standardised on C. 150, P. 80, F. 120, and insulin 25 and 23 units daily. He remained well and sugar-free with a resting blood-sugar of 0·04–0·1 until December when he developed an acute maxillary antritis. Diet had subsequently to be reduced to present one. *Present treatment.* Diet: total calories, 1772; calories per kg., 36; C. 100, P. 60, F. 120. Insulin: 25 units b.d. *Present condition.* Usual resting blood-sugar: 0·04–0·16. Trace of sugar often present in urine. Weight: 7 st. 10 lb. Height: 5 ft. 2 in. Sexual development: penis infantile in type, and only beginning to develop; a few pubic hairs only. Activity normal.

CASE 17.—Boy aged 13½. History of occasional colds, measles, and chicken-pox. When he was twelve years old (April 1932) he had a sore-throat, and a fortnight after this he seemed to be passing more urine and eating and drinking a great deal. He seemed out of sorts and lost a good deal of weight in a few weeks. *Severity.* On admission (June 1932), on restricted carbohydrates, the resting blood-sugar was 0·25 g., and he was passing 10 g. glucose in 24 hours. Drowsy; severe ketosis. *Present treatment.* Diet: total calories, 1772: calories per kg., 34; C. 100, P. 60, F. 120. Insulin: 12 units b.d. *Present condition.* Usual resting blood-sugar: 0·07–0·10. Usually sugar-free. Weight: 8 st. Height: 5 ft. 0½ in. Activity normal.

CASE 18.—Boy aged 9½. Scarlet fever at 7. One brother aged 24 has severe diabetes treated with insulin. In January 1933 he developed thirst and polyuria, became out of sorts and seemed to be losing weight. *Severity.* Urine contained sugar and acetone in large amounts. Sugar tolerance: F.B.S., 0·13; (25 g. glucose) 0·21, 0·25, 0·30, 0·26, 0·25. *Present treatment.* Diet: total calories, 1720; calories per kg., 54; C. 165, P. 50, F. 90. Insulin: 12 units b.d. *Present condition.* Usual resting blood-sugar: 0·06–0·10. Usually sugar-free. Weight: 5 st. Height: 4 ft. 8 in. Activity normal.

Age-incidence.—It will be seen from these notes that the diabetes came on in one case at 3, in one at 4, in one at 6, in three at 7, in two at 9, in one at 10, in one at 11, in three at 12, in four at 13, and in one at 14.

THE CAUSE

The disease is familial in six patients but evidence of heredity could be traced in only one of these. Cases 10 and 11 are brother and sister. The former also has double cataract and the latter severe congenital heart disease. A great-aunt in this family is also said to have had diabetes. Case 5 had a brother who died of acute diabetes at 18. Case 3 had a brother who died of diabetes at 25. Case 18 has an older brother with severe diabetes. Case 16 has two first cousins on the father's side with severe diabetes. In the remainder a family history of diabetes was known in only one, and the families appear to be healthy in other respects. These cases support Cammidge's view that diabetes is more likely to be grave when it is transmitted as a recessive characteristic. The manner of onset was broadly the same in all cases but in one the development of cataracts was the first symptom which led to diagnosis.

Predisposing causes.—All the children except the one with congenital heart disease and Case 3 appeared to be in normal health until the onset. Of the infectious diseases mumps was an immediate prelude to the onset of symptoms of very severe diabetes in three. Case 2 had mumps in June, 1925, at the age of 12, followed a few days later by slight epigastric discomfort. A few weeks later thirst and polyuria developed. This persisted and two months after he had a resting blood-sugar of 0·28 and passed 113 g. of glucose in 24 hours. He now needs 80 units of insulin a day. Case 4, at the age of 7, developed "influenza" followed by mumps. The attack was a mild one but was accompanied by some abdominal pain which lasted for eight days. Three weeks after this he developed sudden thirst and polyuria and he was found on examination to have severe diabetes. Now, at the age of 13, he requires 50 units of insulin a day. Case 14, at the age of 13, developed a moderately severe attack of mumps which left him out of sorts for three weeks. Severe thirst and polyuria then developed, and three days later he sank into diabetic coma with a blood-sugar of 0·6 per cent., from which he did not recover. He never complained of any abdominal symptoms.

Acute pancreatitis is a rare complication of mumps but has been recorded by many authors: Simonin[1] referred to 10, Moutier[2] 74, Freund[3] 8, Dopter[4] 45, and Brahdy and Scheffer[5] 13. Post-mortem examinations are recorded by Lemoine and Lapasset,[6] Sabrazes,[7] and by James.[8] In these three cases extensive changes were found throughout the whole gland and islet tissue was also involved. Glycosuria and hyperglycæmia are mentioned as being present in some of the more severe cases, but diabetes as a sequel is apparently very rare. Cases are described by Harris,[9] Barbieri,[10] Gilhespy and Holden,[11] Patrick,[12] and Dick.[13]

Harris's patient was a man, aged 40, who developed thirst, hunger, and polyuria one month after the onset of an attack of uncomplicated mumps. These symptoms gradually increased and three years later he had lost 30 pounds in weight, and was passing 6440 c.cm. of urine in the day containing 4·6 per cent. of glucose. There is no record of abdominal pain at the time of the attack of mumps.

Barbieri's case was a boy, aged 6, who developed epigastric pain, vomiting, and diarrhœa six days after the onset of mumps, and hunger, thirst and severe glycosuria a few days later. These symptoms subsided after 15 days.

Gilhespy's patient was a boy, aged 16, who, on the fourth day of an attack of mumps, developed thirst and polyuria, and when seen a few weeks afterwards had severe diabetes. He also had tuberculosis and died five months later.

Patrick's patient was a girl, aged 8, who had an uncomplicated attack of mumps without abdominal pain, and two weeks after the onset developed polyuria followed by thirst and hunger. Five weeks after the onset of the mumps she was admitted to hospital in diabetic coma with 8 per cent. of sugar in the urine and died in 36 hours in spite of insulin treatment.

Dick's patient was a girl, aged 13, who within a few months of a moderately severe attack of mumps without abdominal pain was found to be wasted, and to have severe diabetes.

Gundersen[14] states that after epidemics of mumps there is a rise in the death-rate from severe diabetes in the young age-group. Joslin[15] says: "In only a few instances have I been able to associate infectious diseases with diabetes. In fact the more seriously I search for them the more rarely do I find trustworthy instances." Of the eight cases cited here of diabetes following mumps there was only one in which symptoms suggestive of severe pancreatitis were present and this was the mildest case of diabetes. In the other seven, abdominal symptoms were absent or very slight.

In this series the onset was not associated with any other specific fevers. Mild infections preceded the onset of symptoms in three cases and in three others appeared to have provoked an exacerbation of symptoms which led to diagnosis. In the remainder, however, the diabetes appears to have come on silently, and usually with great rapidity and severity, in children who had previously been in perfect health.

SEVERITY

The severity of the disease in children is well shown by the sugar-tolerance curves which have been done in these cases. It is true that many of these curves were taken after the condition had been present for several years, but there is evidence that the sugar tolerance is usually severely impaired within a few weeks or days of the first onset of symptoms and the suddenness of the onset of symptoms in some cases is very suggestive of sudden failure.

Case 13 was healthy until she was 4 years old. She then seemed out of sorts for a few weeks, developed a feverish cold with thirst and polyuria, and the next day becomes comatose with a blood-sugar of 0·49. Case 7 was healthy until he was 10. He then became thirsty for a few weeks, scalded his foot slightly, and was admitted to hospital four days later on the verge of coma with a blood-sugar of 0·38 per cent. Case 12 was well until she was 3 years old. She then developed frequency and became pale and out of sorts. Three weeks after the onset her doctor found sugar in her urine and on admission a day later the specific gravity of the urine was 1050 and contained a great deal of sugar and acetone, and her resting blood-sugar was 0·26 per cent. She was then passing between 22 and 36 g. of glucose in 24 hours.

Among these, there is no case which could be called mild and even those who attended a doctor as soon as could reasonably be expected were found to have gross impairment of sugar tolerance and ketosis.

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(To be concluded)

Clinical and Laboratory Notes

A CASE OF ADDISON'S DISEASE TREATED WITH COMMON SALT

By W. Gordon Sears, M.D., M.R.C.P. Lond.

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A LEADING article in The Lancet of Jan. 20th, 1934, referred to the use of common salt in the treatment of Addison's disease, and gave an account of experimental work showing alteration in the amounts of inorganic bases present in the blood in adrenal dysfunction. In the following case opportunity was taken to investigate the concentration of the metallic bases in blood before and after the administration of sodium chloride by mouth. It is evident that no conclusions can be drawn from one set of figures in an isolated case, but the results are of interest in confirming the presence of abnormalities already described by the American workers.

The patient, a man aged 52, was admitted to St. George-in-the-East Hospital on March 10th, 1934. The diagnosis of Addison's disease was made at the London Hospital in 1927, and since then he has been in hospital on several occasions. In 1931 he received a course of injections of cortical extract which was followed by improvement in his general condition. He was readmitted in 1932 with symptoms of increasing weakness, anorexia, vomiting, giddiness, and precordial pain. (Blood-sugar 76 mg. per 100 c.cm.; Wassermann reaction negative.) A further course of cortical extract was given. His blood pressure at this time was 125/88 mm. Hg. (An abnormal feature of this case has been that the blood pressure has never been observed to be very low.) He remained fairly well for 14 months and was able to do some light work, but during four weeks before admission there had been recurrence of symptoms. He complained of increasing weakness, giddiness, and slight cough. He though that the pigmentation had increased in intensity.

On examination there was generalised pigmentation, excessive in the axillæ, nipples, and on the back of the neck. Some pigment was present in the buccal mucosa and in the palate. His blood pressure was 120/80. After a sample of blood had been taken for analysis he was given 60 grains of common salt daily by mouth in addition to the amount usually taken with meals, making a total of approximately 5 grammes per diem. A week later blood was again taken for examination. The blood pressure was found to have risen to 140/85. His general condition had improved, the extreme weakness had gone, and he was able to get about quite well. He stated that he was feeling as well as ever and wished to go home. He was advised to continue taking an increased amount of common salt daily.

I am indebted to Dr. A. B. Rosher, pathologist to the Mile End Group Laboratory, for undertaking the blood analysis and for his permission to utilise the results. The figures obtained are shown in the accompanying Table.

	Before taking NaCl.	After taking NaCl.	Normal.
Calcium	10·8	8·16	10·0
Potassium	56·0	16·0	16 to 22·0
Sodium	248·0	452·0	330·0
Magnesium	1·25	1·01	1·6
Chloride as Cl	268·0	455·0	300·0 to 500·0

All results are expressed as mg. per 100 c.cm. of blood.

It will be seen that the most striking variations from normal, before giving sodium chloride, are the low sodium and the increased potassium content of the blood. The administration of sodium chloride resulted in a reversal of this state. The blood sodium rose to above the normal level and the potassium decreased to the minimum normal figure. These results are in general agreement with those referred to in THE LANCET—namely, that in Addison's disease the sodium content of the blood is low and can be raised by the administration of sodium chloride by mouth. Although Loeb stated that the potassium balance in adrenalectomised dogs was undisturbed, Harrop, Soffer, Ellsworth, and Trescher found that potassium, calcium, and magnesium were all increased. In the present instance the figures for calcium and magnesium are approximately normal, but the potassium value shows considerable increase in the first specimen of blood taken. The period of observation was too short to arrive at any conclusion as to the real value of sodium chloride as a therapeutic agent in the treatment of Addison's disease, but the patient appeared to improve considerably and the systolic blood pressure rose 20 mm. Hg. The patient himself stated that he felt very much better and that the improvement had been as marked and rapid as on the previous occasions when he had been treated with cortical extract.

I am indebted to Mr. Alan Gairdner, medical superintendent of the hospital, for permission to publish the case.

LOOSE BODIES FROM A KNEE-JOINT

OSTEITIS DISSECANS

BY W. B. R. MONTEITH, M.A. Camb., F.R.C.S. Edin.

LOOSE bodies have long been recognised as one of the possible causes of functional disability of joints, and more particularly of the knee-joint. Mr. H. A. T. Fairbank[1] has recently discussed the pathology of osteitis dissecans, favouring the view that the morbid processes result directly from injury. In the following narrative the condition might more correctly be described as a sequel to osteitis dissecans rather than the actual condition itself. The complete renewal of functional ability following operation, in spite of about 36 years' lameness, seems further to show the importance of reminding ourselves, when dealing with a single stiff and painful joint, of this curable condition.

Mrs. A., aged 46, consulted me in December, 1932, because of weakness and recurrent swelling of the right knee, and inability to bend it. At the age of 10 she fell on a hard stone, and the knee had given trouble ever since. Six or seven weeks after this first injury she jumped off a gate, and felt "as if something shifted in the knee and then clicked back into place"; she fell down with the pain. Seven years ago (at the age of 39) she fell down a step, doubling the right leg under her. Since then she has been unable to kneel and the knee had frequently been greatly swollen. She had always been able to ride a bicycle in spite of the disability. The left knee had never caused trouble; all other joints were normal and there was no rheumatic family history.

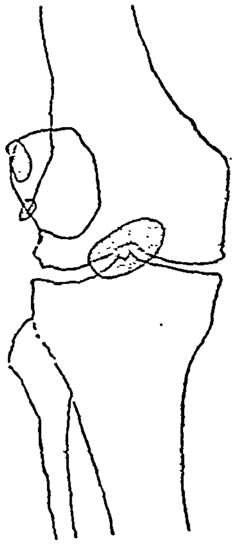

FIG. 1.—Tracing from radiogram of knee-joint, showing three loose bodies (stippled.)

On examination, the right knee was swollen and some fluid was present. Flexion was possible to a very small degree only on account of pain. A "loose body," the size of a pea, was felt on the lateral aspect of the external femoral condyle. While this body hardly seemed sufficient to account for the symptoms, it was supposed that it might sometimes lodge between the articular surfaces. The patient was admitted to the Butterfield Cottage Hospital, Bourne, and an X ray photograph was taken. Before photographing, the leg was extended and fixed on a splint, to prevent any shifting of a loose body between the time of examination and the subsequent operation. The photograph showed not one but *three* loose bodies, the largest lying between the femoral condyles and being obviously the cause of the symptoms. (Fig. 1.)

I operated the next day. The movable body lying over the external condyle was transfixed by a straight needle passing through the skin. A vertical incision 4½ in. in length was made over the lateral aspect of the knee-joint and the needle was followed down to the "body," which was removed. (Fig. 2.) The knee was then slowly flexed and a gloved finger introduced into the joint was able to feel the largest body sliding up the inclined plane of the condyle. Removal was effected by means of curved volsellum forceps. It may be worthy of note that whereas the largest body and one of the others was free within the joint cavity, the third was attached to the bone by a vascular pedicle. The usual precaution of tight bandaging was taken to prevent effusion into the joint. The wound healed perfectly; the patient was in hospital three weeks; and now, after eight months, the joint is faultless.

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[1] Brit. Jour. Surg., 1933, xxi., 67.

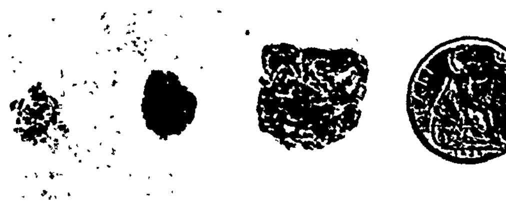

FIG. 2.—The loose bodies, beside a halfpenny.

In this case no "crater" in bone was visible in the X ray photograph, such as is described as occurring in osteitis dissecans, but the length of history might surely quite well account for the absence of that appearance. The patient, quite unprompted, gave a history of three distinct injuries. It seems to me that on one of these occasions a small area of bone and cartilage necrosis was caused, such as is described in osteitis dissecans and that at one of the latter accidents this was displaced into the joint cavity. Alternatively, each body might have been caused by a separate injury.

The absolute necessity of taking an X ray photograph when a loose body is suspected, even if one can be felt, seems to be well shown. Also, the completeness of the recovery in spite of the patient's age and the long history of disability is interesting.

Bourne, Lincs.

MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

SECTION OF EPIDEMIOLOGY AND SECTION OF PSYCHIATRY

At a joint meeting held on April 27th, Dr. J. D. Rolleston being in the chair, a discussion on the value of the

Treatment of Mental Deficiency

was opened by Dr. F. C. Shrubsall for the section of epidemiology and state medicine, and by Dr. W. Rees Thomas and Dr. Noel Burke for the section of psychiatry.

Treatment, Dr. Shrubsall explained, included training and supervision for the encouragement of such abilities as existed and the stabilisation of character. Its value meant the value to the individual sufferer, to the other members of his family, to the community at large, and to the local authority. If social and educational treatment were to be of value, it was of the utmost importance that the process of ascertainment should be as complete as possible. At the end of 1933 London had actually been dealing with about 20,000 cases and had a knowledge of some 11,000 others, a total which roughly corresponded with the estimate of the Wood Committee. Every year a number of defectives had to pass from supervision into institutional care as their parents died or became unable to provide a home for them. These persons would in any case need some form of public assistance of a residential character, and so the choice for the local authority was not between providing institutions and nothing, but between providing certified institutions and public assistance institutions. For many reasons the certified institutions were more suitable and more economical.

Perhaps the most valuable activity of institutional treatment was the prolonged care of low-grade cases, and of patients of higher mentality who were handicapped by physical defects. It was a great boon to such sufferers to be kept away from comparison with the relatively normal inmates of public assistance institutions. Physically defective patients imposed extra cost on the latter institutions, and many defectives if not in certified institutions would have to remain in hospitals for chronic cases, a nuisance to their fellow-patients and the staff. For defectives who were able to work, a certified institution offered a safe asylum while protecting the community against crime and the propagation of undesirable offspring, and enabling the patients to contribute towards their own maintenance and to gain the happiness which resulted from useful occupation. The cost of such institutions was little more than that of an ordinary public assistance institution. A certain number of higher-grade patients with more emotional control acquired from training sufficient stability of character to be restored to life in the community, first on licence and subsequently on discharge. There was thus a definite flow of persons back to community life, so that an additional expenditure of three shillings to six shillings a week brought the community a substantial dividend. Guardianship cost from ten shillings to fifteen shillings a week and provided a closer degree of control than would be available if the family simply received out-relief. Supervision helped the family and the patient, enabled closer care to be provided at once if necessary, and assisted the younger persons to obtain employment.

Special schools excluded the lower grades and the merely dull or backward. Higher-grade cases leaving special schools could secure posts more readily and at a higher rate of pay than children from the lower forms of ordinary elementary schools. Figures from one school over a period of 14 years showed 86 per cent. of employable and 82 per cent. of employed ex-pupils. Moreover, of 168 mentally defective adults charged before magistrates in the last two years, 65 only had attended special schools; considering that over 700 defectives left special schools in London every year, the proportion was a low one. The danger that defectives left in the community might produce large numbers of defective children was less than had been stated. According to the Brock Report, the abnormal fertility of defectives was largely mythical and mortality among their children was unusually high. Moreover, the children of defectives generally had a mentality superior to that of their defective parents.

Medical or surgical treatment offered little prospect of success; the treatment of syphilis at an early age did something to reduce the number of patients who developed specific encephalitis later, and a few cretins were benefited by thyroid treatment. The Mental Deficiency Acts and Section 55 of the Education Act might, said Dr. Shrubsall, be compared to a filter which, by removing insoluble residues, enabled the social machine to function more smoothly. Defective children in ordinary school classes held back the remainder or were left to stagnate; a probation officer saddled with a group of mental defectives could neither place them properly nor devote the necessary time to his other charges. Many petty offences by defectives were due to stupid rather than deliberately antisocial acts. Public hospitals were relieved of helpless and dirty patients, and families were relieved of children who would otherwise be a constant anxiety. The public, in short, received a return for its expenditure. "It is wise economy," quoted Dr. Shrubsall, "to spend more to waste less."

Dr. **Thomas** pointed out that the value of treatment depended on the object in view. Little progress had been made in research into causation, but considerable success had been achieved in training patients to carry on an independent social existence. The advisability of training a defective who could not be expected to become wholly or partly self-supporting was often questioned, but mere isolation and handling without any form of treatment or any of the amenities of life were not a possible solution but a remnant of the Middle Ages. Colony life enabled patients and staff alike to live up to their full capacity, and gave the patient the happiness of relative success. Leave of absence on licence provided an excellent method of deciding the ability of a patient to live in the community. Visitors who taught harassed parents the elements of how to train defectives, and possibly provided some material, did much good. Where a number of patients could be collected, occupational and industrial centres could be conducted with much benefit. The nation should regard its progress in the treatment of defectives as a compliment to its good sense and medical instinct. Expressions of incompetence formed a large part of the vocabulary of defectives living under unsuitable conditions, and training often prevented them from becoming a menace to society.

Dr. **Burke** stressed the importance of treating the individual rather than the condition in order to relieve the feeling of inferiority which came from competition with the normal world. It was important, he said, to secure for those who were physically handicapped some sort of physical success, no matter how rudimentary, in occupation or handicraft. Training in reasonableness, self-control, and trustworthiness could be given through the medium of the Scout or Guide movement. The mental hospital environment was definitely bad for defectives, and produced a type recognisable by a peculiar dullness and lethargy.

DISCUSSION

Dr. **Ralph Williams** pointed out that mental defectives were often more efficient factory workers than normal persons, because of their greater capacity to perform monotonous tasks.

Dr. **Letitia Fairfield** said that the criminal defective, to whom so much attention had been drawn, was the untrained defective, who had not been through the special school. London had made every effort to ascertain these defective criminals, and—with all the talk about this menace to society—the numbers reported every year hardly amounted to a full morning's work at one police-court. A thorough comb-out of the casual wards had found last year only two defectives. The problem of training would continue to be urgent, however drastically defectives were dealt with by sterilisation and other means.

Dr. **G. de M. Rudolf** narrated that in 1930 Brentry House, near Bristol, had instituted a system of behaviour records and new methods of handling patients to give them the utmost freedom and responsibility. The figures of misbehaviour had fallen amazingly as a result of the new régime.

Dr. **Isabel Wilson** remarked that money spent on training defectives went very largely to relieving their homes and getting better treatment for the other children. There was, she thought, too great a tendency to teach defectives in institutions facts about institution rather than about community life.

Dr. **Murdo Mackenzie** considered it a pity that the special schools were associated with the phrase "mentally deficient," which had an unfavourable effect on parents.

Dr. **W. A. Potts** quoted figures from Birmingham which showed that the incidence of high-grade mental deficiency closely followed the death-rate in the various wards of the city.

Dr. **C. J. C. Earl** said that prolonged residence in an institution did not fit a patient for community life unless he were trained to more or less complete freedom. He pleaded for closer psychiatric investigation and treatment of defectives.

Sir **W. Dalrymple-Champneys** regarded the modern treatment of defectives as evidence of the progress of the human race, and doubted whether it could have been achieved in any but the Christian era.

NORTH OF ENGLAND OBSTETRICAL AND GYNÆCOLOGICAL SOCIETY

A meeting of this society was held at Liverpool on April 6th with Prof. **Daniel Dougal**, the president, in the chair.

Breech Presentation

Dr. **J. W. Burns**, reading a paper by himself and Mr. **C. M. Marshall**, contended that much of the text-book teaching on this subject is unsupported by facts—with the result that there was a fœtal mortality of 15 to 30 per cent. in breech cases throughout the country. Breech labour, he said, carries great risks both for mother and child, but attempts to prevent it by external version should not be made as a routine, since manipulation of the uterus is liable to separate the placenta. In management of the labour itself everything possible must be done to prevent early rupture of the membranes.

The patient is put to bed as soon as labour has started. She is encouraged not to bear down during the pains, and the usual enema or purgative is withheld. One vaginal examination is made to find out whether the cord is presenting. A comfortable binder (the "labour belt" devised by Sister Miller of the Liverpool Maternity Hospital) is applied; it has numerous buckles and straps which can be readjusted from time to time. There is much to be said for inserting a sausage-shaped balloon filled with water into the vagina to support the forewaters until the os is fully dilated. (This closely resembles the bag suggested by Farquhar Murray for the treatment of placenta prævia.) During the first stage the patient is given nourishing drinks. She is encouraged to rest between pains. Bromides and chloral are useful, especially the latter.

When the membranes rupture a vaginal examination is made to find out whether the cord is prolapsed, how much dilated the cervix is, and whether the legs are extended, if this has not been discovered in the antenatal period. Nothing more is done until the breech appears at the vulva, except that the labour belt is adjusted periodically from above down as the uterus descends. When the breech appears the patient is placed in the cross-bed position and a Clover's crutch is applied: the binder is tightened. No handling of the fundus is allowed, because of the danger of causing premature separation of the placenta. The attendant feels for the feet as soon as the buttocks are born and gently lifts them over the perineum; he takes care not to pull on the limbs. The umbilicus usually follows with the next pain. The cord is found and drawn down so that further descent of the infant may not cause tension on it. (Dr. Burns thought it high time that teachers refrained from instructing pupils to endeavour to place the cord in some position where it will not be subjected to pressure. "This is an impossibility and no one nowadays attempts it.") After the next pain a finger is inserted to find out whether the arms are in the pelvis; if so, they are gently drawn down. The shoulders follow with the next pain. At this stage the head is entering the brim. The attendant supports the body and allows internal rotation of the head to occur; as soon as the occiput has come forward he allows the body to hang from the vulva. This brings about flexion of the head and brings the nape of the neck well into the subpubic angle.

The mother's perineum and soft tissues act as the fulcrum. The suboccipital area of the infant's skull is in contact with either the back of the symphysis or the descending rami of the pubes. The child's weight acting through the neck and across the fulcrum forces the head to rotate on its horizontal axis—i.e., flexion is induced. This method of producing flexion acts whether the head is just above the brim or whether it has entered the pelvic cavity. If the head is at the brim, this method has several advantages; no traction is required by the operator; the shortest diameters of the child's head are rolled through the brim (i.e., the suboccipito-frontal and suboccipito-bregmatic): the minimum of force necessary to produce flexion of the head is used; undue haste in delivery is avoided; there is no need for fundal or suprapubic pressure, and the danger of premature separation of the placenta is thus minimised. If the head is in the cavity flexion of the head is still necessary, so that the shortest diameters of the child's head may distend the perineum, and thus the risk of tearing the perineum or damaging the head may be minimised. By allowing the baby to hang from the vulva for one or two minutes the nape of the neck is brought more into the subpubic angle without the use of undue force. The force employed is limited by the child's body-weight.

As soon as the suboccipital area of the head can be seen in the subpubic angle delivery can be brought about by lifting the child up towards the mother's abdomen.

The operator should stand on the right side of the patient, and taking the child's feet in his right hand exert tension on the body from the moment the feet are seized. This tension must be enough to keep the neck of the child taut, and it is maintained while the legs and body are lifted in an arc until the body is vertical. By this manœuvre the suboccipital area is made to rotate around the point of contact between the skull and the pubic rami, so that the suboccipito-mental diameter distends the perineum, then the suboccipito-frontal, and lastly the suboccipito-bregmatic. If tension is not maintained throughout this manœuvre the child's head simply rotates within the pelvis, the occiput recedes and the perineum is not distended. Further, the child's neck is merely bent, and much damage may be done to the structures in it without the head being delivered.

Mr. MARSHALL described the technique he used in delivering the frank breech in primigravidæ. As soon as the anterior buttock is showing the mother is put in the lithotomy position, the whole perineum is infiltrated with about 50 c.cm. of 0·5 per cent. novocain solution, the index-finger is placed in the anterior groin, and descent with the pains is aided by traction. When the anterior buttock is showing well, and the posterior strongly bulging the perineum, a mediolateral episiotomy is performed. The posterior groin is then reached if necessary, and the buttocks are born. Chloroform is administered on an open mask, and the extraction is completed. When the arms have been brought down the body is allowed to hang from the vulva for some moments. In rather less than half the cases the amount of neck visible lengthens, and the head enters the pelvic cavity. The head is then delivered by Dr. Burns's method. If the head does not enter readily or there is delay in its descent through the passage, pressure with the free hand is applied to the head just above the pubes.

As a rule, Mr. Marshall said, delivery was easily effected by these methods. Forceps were used in a few of the very early cases, but were now very seldom required. In 33 consecutive breech deliveries in primigravidæ there had been only one stillborn child: this was in one of the early cases and one of 27 in which the legs were extended; the head was difficult to extract, and Mauriceau's grip was used to bring it through the outlet. The average weight of the babies was 7 lb. The perineal anæsthesia was useful because it allowed the mother to bear down with less pain and apprehension, because groin traction was almost painless, and because episiotomy could be done at any time without resorting to general anæsthesia. To patience and the above methods Mr. Marshall attributed the small number of cases in which it had been necessary to decompose the extended breech and extract. This was done in only two cases: in one groin traction had failed, and in the other unsuccessful attempts had been made to deliver before admission.

In the summing up it was emphasised that no midwife should be allowed to undertake a breech labour unassisted: she should send the patient to her own family doctor or to an institution as soon as the diagnosis was made.

Fluid Restriction in Pregnancy Toxæmia

Mr. W. J. CHISNALL read a paper on the treatment of albuminuria of pregnancy associated with hypertension, according to the method advocated by J. O. Arnold and Temple Fay.[1] In pre-eclampsia, he said, there was a progressive diminution in urinary output, associated with storage of fluid in the body. The object of the treatment was to correct the state of hydration by reducing the fluid intake, so that it never exceeded the urinary output of the day before. Accessory measures adopted in some of the cases with a view to reducing intracranial tension were the intravenous injection of glucose (40 c.cm. of a 20 per cent. solution) or magnesium sulphate (20 c.cm. of a 20 per cent. solution) and spinal drainage. These methods were used only if high blood pressure, headache, and dimness of vision were not quickly responding to reduced fluid intake.

A standard diet is employed. Its caloric value is 1500 and it contains 70 g. protein, 30 g. fat, 240 g. carbohydrate, and 3 g. salt. Beef or mutton, cod or hake, boiled puddings, bread and butter, tea and cocoa are allowed. Meals are taken at 8 A.M., 12 noon, and 4 P.M. and a drink is given at 8 P.M. No eating or drinking between meals is permitted. When a patient is admitted a history is taken and a complete examination made. An arbitrary figure is chosen for fluid intake for the first 24 hours, from 600 c.cm. in a mild case down to nil for a severe case. All urine passed is collected and measured. A dose of mist. alba is given each morning before breakfast. On the morning after admission a catheter specimen of the urine is obtained, and a simple enema is given. A sample of the 24 hours specimen is put up in an Esbach tube each night. After the first day, the amount of fluid allowed is equal to the urinary output for the previous day. If the patient is discharged undelivered, she is instructed to keep to the diet and fluids taken in hospital: she still takes the mist. alba every morning, and attends the antenatal clinic weekly. If improvement is only temporary or not adequate, labour is induced by the bougie method.

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[1] Surg., Gyn., and Obst., 1932, lv., 129; see THE LANCET 1932, ii., 639.

At the Walton Hospital, Liverpool, between October, 1932, and October, 1933, the method had been applied, Mr. Chisnall said, to 39 cases of pre-eclampsia, defined as a disorder of pregnancy associated with albuminuria, œdema, and hypertension, without evidence of previous nephritis. Among them were 28 primigravidæ. Medical treatment sufficed in 36 cases, but in the other 3 (all primigravidæ) labour was induced because improvement was not maintained. The treatment in favourable cases was followed by reduction of blood pressure to normal figures, disappearance of œdema, diminution of albuminuria, and cessation of symptoms. In all cases a healthy live child was born; in 36 the mother was cured, and in 3 the symptoms recurred after partial relief. Despite the restricted fluid intake a progressive increase in the daily volume of urine occurred, lasting from 4 to 10 days, after which the volume remained steady. This was equal to the volume of fluid which could be allowed without storage occurring. If the intake went beyond this figure the symptoms tended to recur.

REVIEWS AND NOTICES OF BOOKS

Recent Advances in Medicine

Clinical, Laboratory, Therapeutic. Seventh edition. By G. E. BEAUMONT, D.M., F.R.C.P., and E. C. DODDS, M.V.O., M.D., F.R.C.P. London: J. and A. Churchill. 1934. Pp. 485. 12*s.* 6*d.*

THE great success which this book has achieved during its ten years of life has been well deserved. A number of notable additions appear in the present issue. The first chapter now includes an admirable review of the present position of the sex homones—to the elucidation of which Prof. Dodds has largely contributed—and the vitamins, and ends with an account of the parathyroids and their relation to calcium metabolism. In the chapter on the kidneys the urea-clearance test is fully described, and a good account is given of the ketogenic diet in the treatment of urinary infections. The chapter on the stomach shows little alteration—a fair comment on the lack of progress made in the treatment of digestive disorders. A few additional illustrations are included in the account of the electrocardiograph, but the space allotted to this important branch of cardiology is still perhaps rather too small. Some help in the actual handling of the apparatus might be appreciated by readers who are well served with detail in the very full account of basal metabolism determinations. In the next edition a short section on radiography of the heart might also be included with advantage. The conclusion reached on sanocrysin in the treatment of pulmonary tuberculosis is that its value is doubtful, the immediate and ultimate results of its use being often disappointing. A number of changes are found in the laboratory methods of blood and urine examinations, which, as in previous editions, are given in enough detail to be of practical service.

"Recent Advances in Medicine" is now a standard work, which will continue to attract grateful readers in ever larger numbers.

A Diabetic Manual

Fifth edition. By ELLIOTT P. JOSLIN, M.D., Clinical Professor of Medicine, Harvard Medical School; Consulting Physician, Boston City Hospital. London: Henry Kimpton. 1934. Pp. 224. 10*s.* 6*d.*

IN its fifth edition this well-known manual has been considerably altered and greatly improved. The statistical data and charts supplied show the great improvement which has taken place in the treatment of diabetes, even as compared with the early and middle Banting period. Dr. Joslin does not advocate the extreme high carbohydrate-low fat diet, containing 250–350 g. of carbohydrate and 50 g. of fat, but uses a moderate one of 150 g. of carbohydrate and 90 to 100 g. of fat. The book offers useful hints on the control of the blood-sugar in difficult cases, and the treatment of coma is fully discussed. Dr. Joslin stresses the importance of the care of the feet, because the incidence of gangrene of the foot is still much too high. For the treatment of corns, the coöperation of a skilled chiropodist should be enlisted. The prevention of athlete's foot (ringworm of the toes) seems to require special precautions. The increasing incidence of diabetes among elderly persons, especially women, is disturbing. Dr. Joslin makes a strong plea for the avoidance of obesity, which he thinks is a prominent factor in its production.

The photographs of diabetic patients running, jumping, and the many sketches, provide an encouraging indication of the success of modern methods and make the book attractive to read.

Healthy Childhood

By HAROLD C. STUART, M.D., Assistant Professor of Pediatrics and Child Hygiene, Medical School and School of Public Health, Harvard University; Associate Physician, Children's Hospital, Boston, Massachusetts. London and New York: D. Appleton-Century Company Inc. 1933. Pp. 393. 8*s.* 6*d.*

THE convention in 1930 of the White House Conference on Child Health and Protection by President Hoover was an event which marked the recognition of the imperative call for a wider understanding of the physical and mental needs of childhood, and it is perhaps significant that the whole machinery of the conference was put in motion during a period of national crisis. It will be some considerable time before it will be at all possible to evaluate the work of the conference and before much of the data gathered by subcommittees can be generally assimilated. The "Children's Charter" (which Dr. Stuart quotes in full) may perhaps seem at first sight too idealistic and nebulous to serve as a working basis for investigation and research, but such a simple statement of the aims of the conference is definitely enlightening. The Century Childhood Library has been published with the object of rendering much of the material of the conference reports available to parents, and in this work Dr. Stuart, who was himself vice-chairman of the committee on the growth and development of the child in the medical section of the conference, has given a résumé of the physiology and development of the normal child, and of the aspects of preventive medicine concerned with the preservation of child health. Some indication of the scope of the book is given by the chapter concerned with the prevention of infectious diseases, in which the author describes the use of diphtheria toxin-antitoxin, the limitations of the Dick test, the employment not only of convalescent serum but of placental extracts in the prevention of measles, and refers to (though he does not recommend) the use of B C G. Whilst his treatment of the subject has necessitated the use of a considerable number of technical terms, Dr. Stuart has been singularly successful in presenting it in a form which should be perfectly clear to the educated layman. It is possible that even some of the medical profession may find in it a gentle reminder that they must polish their armour if they are not to be caught napping by their patients' parents!

Marriage and Parenthood

Issued by the Marriage and Parenthood Committee of the Society of Friends. London: Friends Book Centre. 1934. Pp. 16. 3*d*.

THIS excellent little brochure contains four chapters entitled The Engagement, Marriage, Parenthood, and The Home. The author, whoever he is, deserves congratulation on the vision he has displayed in relating the new outlook of marriage and parenthood with the religious values in the perspective of which the Quaker believes all human aspirations should be viewed. From the spate of books, pamphlets, and leaflets dealing with the problems of human reproduction, this little document stands out by reason of its breadth, its understanding, and its sobriety. Doctors are often consulted by anxious parents as to what advice should be given to young people who are contemplating matrimony. They may even be puzzled to know what advice to give to their own children when in this predicament. This brochure is recommended, not as a source of information on physiological problems, but as a gentle reminder that, over and above the knowledge of sex psychology and physiology which so preoccupy us to-day, a successful and durable marriage makes spiritual demands which it is well to recognise beforehand.

A Text-book of the Practice of Medicine

Fourth edition. By Various Authors. Edited by FREDERICK W. PRICE, M.D., F.R.S. Edin., Consulting Physician to the Royal Northern Hospital; Senior Physician to National Hospital for Diseases of the Heart. London: Humphrey Milford, Oxford University Press. 1933. Pp. 1995. 36*s*.

IN the fourth edition of this popular work many articles have been largely rewritten, and the sections on the diseases of the spleen, blood, and lymphatic system entirely so. Amongst recent methods of treatment now included are the use of Felton's serum in pneumonia, of insulin and glucose in heart disease, and of the compound mercurial diuretics; a very brief reference without details is given to the ketogenic diet in coliform bacillus infections. A full account of idiopathic hypochromic anæmia is now supplied, and brief notes on the filtrable viruses, agranulocytosis, Simmonds's disease, amongst over 50 new subjects mentioned. Of the 13 new illustrations, which hardly come up to the standard of the text, five are orthodiagrams of the heart and two electrocardiograms. It was not easy to find any account of how an orthodiagram is taken or of the normal measurements of the heart as estimated by this means. The electrocardiograms are excellent and their interpretation clear and concise. It is interesting to note the reversion in this edition to the old names of Graves's disease and Hodgkin's disease in place of hyperthyroidism and lymphadenoma.

Dr. Price and his distinguished contributors may be assured that this edition is likely further to enhance the well-deserved reputation of their work.

The British Journal of Surgery

THE April issue (Vol. XXI., No. 84) contains the following papers: A Contribution to the Study of Pulmonary Lobectomy, by A. Graham Bryce (Manchester). An experimental investigation into removal of a lobe of the lung in the cat by the three-stage operation of producing adhesions, ligaturing the pedicle, and excision of the gangrenous lobe.—Multiple Carcinoma of the Colon, with Four Original Cases, by A. J. Cokkinis (London). The growths are regarded as being all of primary origin; their relationship to multiple adenomata is discussed, and their clinical significance is emphasised.—Some Experimental Observations bearing on the Etiology of Megacolon, by Harold Burrows (London). Injections of crystalline silica into the mesentery of the cæcum has been followed by cæcal enlargement. It is suggested that persistent irritation of the sympathetic nerve-supply is the cause.—The Pathology of Acute Strangulation of the Intestine, by Robt. L. Holt (Manchester). An experimental investigation to determine the parts played by perforation and peritonitis, by absorption of toxins, by withdrawal of blood from circulation, and by dehydration, in death from strangulation of the intestine.—Neurosurgery in the Treatment of Diseases of the Peripheral Blood-vessels, by D. J. MacMyn (Mayo Clinic). An outline of the views held and the treatment employed at the Mayo Clinic in certain vascular diseases, particularly in thrombo-angiitis obliterans and Raynaud's disease.—The Selenide Treatment of Cancer, by A. T. Todd (Bristol). An account of treatment by a combination of injection of a colloidal selenide preparation with X-radiation: the results in 155 cases of inoperable cancer (see p. 963).—Bilharzia Disease in England: the Cystoscopic Appearances of the Bilharzia Bladder Before and After Intravenous Injections of Sodium Antimony Tartrate, by J. B. Christopherson and R. Ogier Ward (London).—Spindle-celled Mesenteric Tumours, with Remarks on Similar Retroperitoneal Tumours, by H. A. Phillips (Melbourne). A discussion of the origin, pathology, and classification, with an account of six personal cases.—Observations on Pleural Absorption, by R. C. Brock (London). Observations on the factors influencing the absorption of fluid from the intact and inflamed pleura in rabbits, with a discussion of the clinical bearing of the results.—The Plan of the Visceral Nerves in the Lumbar and Sacral Outflows of the Autonomic Nervous System, by Hugh C. Trumble (Manchester). A description of the autonomic nervous system based on the work of Langley and Anderson together with numerous dissections made by the author. A less chaotic nomenclature than that current in recent literature is suggested.—Malignant Adenoma of the Prostate with secondary growths in the vertebral column simulating Pott's Disease, by W. E. Carnegie Dickson and T. R. Hill (London). The primary growth was very small. The bony metastases were completely osteoclastic, and the main symptoms were due to rapid involvement of the spinal cord.—Primary Carcinoma of the Liver: with report of a case successfully treated by Partial Hepatectomy, by A. Lawrence Abel (London). A comprehensive description of the disease as it appears in the literature, followed by a description of the treatment and pathology of a case.

The issue also contains accounts of some rare and obscure cases.

THE TEACHING OF SPEECH.—The price of Mr. Sibley Haycock's book, reviewed in our last issue (p. 902) is 7*s*. 6*d*. post free.

THE LANCET

LONDON: SATURDAY, MAY 5, 1934

THE G.M.C. ELECTION

Dr. H. Guy Dain was elected on Friday last a direct representative of the registered medical practitioners of England and Wales, thus filling the vacancy created by the death of Dr. Christine Murrell. Dr. Dain has been in active general practice in Birmingham for more than 36 years and is known by his colleagues as a careful, wise, and energetic practitioner. For the last 20 years he has taken part in medico-political work of various kinds and has held offices culminating at last in the chairmanship of the Insurance Acts Committee—a committee which, although it enjoys the generous hospitality of the British Medical Association, is in fact the executive committee of the Insurance Medical Service. His election should give satisfaction to the profession.

Before the result of this by-election was declared, steps had been taken for putting in train an electoral system under which the places occupied for the last five years by Sir Henry Brackenbury and Mr. Bishop Harman when they retire in the coming autumn should be filled. They are both under the Act capable of re-election, and, should they seek the suffrages of the constituency, the medical profession will not be unmindful of their services rendered on that body to the interests of the general practitioner and particularly of their efforts to secure some revision in the medical curriculum which will bring it more into line with the aims and needs of general practice. Now an electoral system which has returned to the General Medical Council three such useful representatives of the profession cannot lightly be criticised, but the fact remains that the method chosen has not brought them to their position by the free and unfettered vote of the medical profession. As regards Dr. Dain's election it did not really take place last Friday but last year, when a notice appeared in the supplement of the *British Medical Journal* of Dec. 23rd (page 315) stating that in connexion with the G.M.C. by-election, certain nominations were received for selection by the English and Welsh constituencies in the Representative Body of one candidate to receive the support of the Association. There followed the names of nine candidates and the voting resulted in Dr. Dain being selected. This was in actual fact the time when Dr. Dain's election was secured, for, as a member of the B.M.A. Council has pointed out, no private candidate could possibly have a chance of success against such a nominee. And the speaker went on to comment upon an election devoid of competition in which no candidate thought it worth while to address the electors, and one out of which all interest had been crushed. Might not these words fairly be applied to last week's election?

In the Marylebone division of the B.M.A., of which one of the retiring candidates is a member, the hon. secretary of the division summoned "a meeting of the whole profession" to consider the nomination of a candidate or candidates to be recommended for election. There are more than 700 members of the B.M.A. in the division, but the attendance at this meeting did not exceed 20, and although support was offered *nem. con.* to the two retiring candidates, free expression was given to the drawbacks of the electoral method and to the feeling that these meetings do not in fact register the choice of the medical profession at large. There are many people both within and without the Association who would like again to see a free nomination and election. It should certainly not reproduce the kind of uninformed scramble in which the election took occasionally in earlier times, and under the auspices of the B.M.A. a number of the factors conducing almost to chaos have been eliminated; but it is plain that the intention of the Medical Act of 1886 is not being strictly observed in the present procedure. No one would stand to gain more from a restitution of the importance of the election than the B.M.A. candidates themselves, who would then have the assurance that they are really representing the medical profession as a whole and not any section of it however influential.

PERFORATION OF PEPTIC ULCERS

Since immediate operation is by common consent the only treatment to be considered in the presence of acute perforation of a gastric or duodenal ulcer, an estimate of the prognosis must take into account, first, the immediate post-operative mortality; and secondly, the subsequent digestive history of survivors. Within the last three years several surgeons have collected the immediate and remote results of their cases. Taking together figures from the practice of surgeons working in Newcastle,[1] Manchester,[2] New York,[3] and Lyons,[4] we have before us the results obtained in over 500 cases treated according to modern surgical methods under good conditions. The average mortality over the 521 cases reported from four hospitals is 19·8 per cent. The type of operation is not always recorded, but of 277 cases in which simple suture, with or without drainage, was done, 43, or 15·5 per cent., were fatal, whereas in 201 treated by combined suture and immediate gastro-enterostomy the corresponding fatality-rate was 21·4 per cent. This difference appears to favour treatment by simple suture, but is not more than might have arisen by chance and cannot be regarded as significant. That simple suture gives remarkably good results is well known; in the Newcastle figures a series of 63 consecutive cases is recorded with only 3 deaths. On the other hand, in the Hôtel-Dieu in Lyons, where

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[1] Gilmour, J., and Saint, J. H.: Brit. Jour. Surg., 1932, xx., 78.

[2] Scotson, F. H.: Brit. Med. Jour., 1933, ii., 680.

[3] Shelley, H. J.: Amer. Jour. Surg., 1932, xv., 277.

[4] Creyssel, J., and de Mourques, J.: Rev. de Chir., 1933, lii., 627.

194 patients received treatment, gastro-enterostomy is almost the routine for perforation; in 25 cases only was simple suture done. Two hundred and forty-five case records come from the hospital practice in Newcastle and Manchester, and include only 30 cases subjected to gastro-enterostomy. Comparison of the results reached at the different centres reveals no consistent advantage of one method over the other. The presence of other important factors makes it difficult, however, to compare results; for instance, the proportion of cases seen within twelve hours of perforation varied between 60 and 80 per cent., and this factor must have an important influence upon the success or otherwise of operation.

In the figures reached by Mr. T. G. Illtyd James and Mr. N. M. Matheson elsewhere in this issue the rather higher fatality-rate is probably related to a fairly high incidence of perforations at or near the lesser curvature of the stomach, and also to a higher average age (half of the patients were in the fifth or sixth decades). That the fatality increases with increase of age is evident in the Lyons figures, which show a rate of 55 per cent. for ages over 60. Undoubtedly, however, the factor influencing it most is the length of time elapsing between the occurrence of the perforation and the operation. This has long been recognised and is emphasised by all surgeons. Combining the figures for all cases in the various series mentioned above in which the length of this interval has been recorded, we find that where the operation took place within twelve hours the fatality-rate is 8·1 per cent., whereas after that time it rises to 25·8. Of the 3 deaths in the 63 Newcastle cases 2 were in patients operated on more than twelve hours after perforations. In this particular series, 51 cases were treated by simple suture of the perforation within twelve hours, and among these there was only one death. The four authors agree that perforation is very much commoner in the region of the pylorus and the first part of the duodenum than it is elsewhere. Of 496 perforations whose site is recorded, 82 per cent. occurred in one or other of these sites. (Attempts to differentiate between the proportion in the duodenum and the pylorus are of little value, since at the operation it is often impossible to be certain of the exact position of the pyloric opening.) Selvaggi,[5] in a recently published paper confirming these figures, records 44 per cent. perforations in the duodenum and 34 per cent. pyloric or juxtapyloric—that is, a total of 78 per cent. in one or other of these regions. The knowledge that the chances are four to one that the perforation will be at an accessible site should encourage the inexperienced surgeon who is faced with the responsibility of dealing with such a case.

Shelley, Gilmour and Saint, Scotson, and Creyssel have all made serious efforts to trace the subsequent histories of patients, and their results tally closely. There has been a prevalent idea among surgeons that once an ulcer has perforated it gives very little further bother to the patient; in fact, that perforation is followed by healing in almost every case. The truth seems to be that somewhere between 20 and 30 per cent. of patients definitely require further treatment; 60 to 70 per cent. are said to have "slight indigestion" only or to be quite free of digestive symptoms. Scotson and Shelley give over 40 per cent. as symptom-free after suture only, and Gilmour and Saint just under 40 per cent. Shelley and Creyssel, on the other hand, both report 61 per cent. of "excellent results" after gastro-enterostomy. The terms "excellent results" and "slight indigestion" are, however, susceptible to various interpretations. Symptoms dismissed by a surgeon as slight indigestion may involve discomfort to the patient over a term of years and may suggest to a physician the presence of a chronic ulcer. It is doubtful whether there is enough evidence of better end-results after gastro-enterostomy to justify a more protracted and severe operation following such a serious emergency as perforation. Still less would most surgeons favour immediate gastrectomy; nevertheless at some of the most important clinics in central and eastern Europe immediate partial gastrectomy is being performed for perforated ulcer. Judine in Moscow (quoted by Gilmour) reports particularly good results from this procedure with a surprisingly low fatality (6 deaths in 47 cases). His results are a tribute to fine surgical technique, but few would favour such drastic methods for general adoption. It is more likely that the tendency in the future will be towards simple suture with more prolonged after-treatment on modern medical lines.

MEDICINE AND CRIME

Justices of the peace might profitably study the recent report of the Commissioners of Prisons (Cmd. 4553, 1*s.* 6*d.*). Two points made by the medical commissioner, Dr. Norwood East, deserve the attention of all courts of summary jurisdiction. The public conscience, we believe, would be shocked if it were known that magistrates either sentenced an insane person to imprisonment or passed sentence in any borderline case without taking into consideration the alleged offender's mental condition. Yet the medical commissioner's report indicates that both these practices survive. An old man, for instance, was remanded to prison on a charge of begging: on his reappearance at court the bench sentenced him to seven days' imprisonment although informed by the experienced medical officer of the prison that the man was insane. The medical officer of the prison to which the old man was sent confirmed his colleague's opinion, and took the necessary steps to have the prisoner dealt with as insane. It is apparently a not uncommon practice for magistrates, when convicting an offender and sending him to prison, to ask that his mental condition be kept under observation during the period of his sentence. This course, as Dr. East remarks, inevitably suggests that insane persons may have been sentenced to imprisonment when they ought rather to be dealt with as patients of unsound mind or else that they may have been punished without due regard to the mitigation which their mental condition might justify. The first point, then, that magistrates should bear in mind is that, where there is any doubt about an accused man's mental state, it is wrong to pass sentence until the doubt has been resolved. A second point is that courts of summary jurisdiction could greatly help the prison medical officer by giving him fuller information. To ask the medical officer to report on a prisoner at the termination of sentence without specifying the reasons for the request is a needless diffusion of the doctor's time. If the clerk of the court furnished a brief note of the facts connected with the offence, the man's previous conduct, his demeanour in court, and any available details of his family and personal history, the task of medical observation would be simplified and expedited, and the report would be the more useful. This common-sense coöperation in the discharge of a public duty (already established in some of the busiest courts) would be equally valuable at whatever stage a medical report is asked for. If, for example, the bench wants guidance because the accused has alleged a loss of memory, that fact ought obviously to be communicated to the medical officer along with the request for a report.

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[5] Selvaggi, G., Ann. ital di Chir., 1933, xii., 41.

In another interesting passage Dr. NORWOOD EAST comments on misunderstandings about certification under the Mental Deficiency Acts. People interested in welfare and after-care work, it seems, are inclined to criticise doctors for not being more swift to certify in cases of persistent antisocial conduct. He reminds the critics that the certification of mental defectiveness cannot go beyond the statutory definition. In the language of Parliament there must be "a condition of arrested or incomplete development of mind existing before the age of 18 years, whether arising from inherent causes or induced by disease or injury." It is natural enough to argue that persistent delinquency is in itself evidence of mental defect, but the problem is not to be solved by automatic certification. In this connexion the medical commissioner gives three instances where there has been a turnover from misbehaviour to normal conduct. All might easily have been classified as cases of mental deficiency, but they turned out to be due, in one instance, to the mental conflicts of childhood afterwards replaced by harmony and maturity, in another to periodical physiological imbalance subsequently readjusted, in the third to the slowness of development of the patient which was eventually caught up. The turnover to normal conduct can sometimes be dated with reasonable precision; "if the former misbehaviour is due to mental defectiveness, we must assume that a mind whose development has been arrested for many years can suddenly overtake that arrest and grow to normality in a few hours; the assumption is contrary to general experience."

Few will now deny the significance of the mental and psychological aspects of crime. The Persistent Offenders Committee recommended that a medical psychologist should be attached to one or more penal establishments to carry out treatment in selected cases. There is plenty of material in our prisons. The examining board of the Royal Colleges, as Dr. EAST reminds us, has recognised the experience to be gained there. It has lately decided to accept twelve months' appointment as medical officer in one of four large remand prisons as the equivalent of twelve months' mental hospital practice required for the diploma in psychological medicine.

THE ACADEMIC ASSISTANCE COUNCIL[1]

A YEAR ago an Academic Assistance Council, including some of the most famous names in British science, literature, and art, was formed to assist university teachers and investigators "who on grounds of religion, political opinion, or race were unable to carry on their work in their own country." The council has received rather more than £13,000 in subscriptions. It has made maintenance grants to 49 scientists or scholars, has assisted in placing another 90 to whom grants from other sources were available, and has helped 39 others who had some resources of their own to find opportunities of work in universities. This is an excellent record of service, and some of the reports on the work of the exiles show how good is its quality. For instance, one referee says of the work of a physiologist, "I think it is possible that the work is of even wider significance than he at present realises himself. It opens up several subsidiary problems in general metabolism. It may well be revolutionary."

The immediate ground of action was, of course, the revolution in Germany, but the Council has most carefully abstained from taking advantage of temporary or permanent national prejudices, and its assistance has not been confined to German exiles. For that very reason, perhaps, its task is difficult. The intoxicated professor in Mr. H. G. WELLS's "The New Machiavelli," who maintained that hate and coarse thinking made a much better slogan than the hero's love and fine thinking, was a practical man. The ordinary citizen can be much more easily induced to mark his disapproval of some specific act of cruelty by "foreigners" than to take any very keen interest in so abstract a cause as that of academic freedom. Already the misfortunes of German intellectuals have lost their news value and it would need another Einstein to restore it. The burden must be shouldered by those educated men and women, a small percentage of the nation, but still amounting to many thousands, who realise what the higher education has meant for them and what horrors are in store for a world in which the principle of academic freedom has perished. Members of our profession are in no need of this warning, the whole history of our science and art abounds in illustrations. Nobody may be in danger of the fate of Dr. JOHN GEYNES who, in 1559, "was cited before the College for impugning the infallibility of Galen. On his acknowledgment of error, and humble recantation, signed with his own hand, he was received into the College." We no longer have to depend on criminals for the possibility of studying human anatomy, it is not even common to hold up experimental physiologists to mob execration. Our bulwark is the existence of a large number of liberally educated people; liberal education as distinct from mere erudition or technical skill, implies academic freedom, unrestricted freedom of intercourse between student and teacher, always provided the student be earnest and the teacher competent. It is because that ideal was held higher in Germany than anywhere else, that its temporary obscuration in Germany is of such importance. English intellectuals have praised, perhaps over-praised, the German universities so zealously, that there is some risk that the man in the street may draw disconcerting conclusions. He has been exhorted to copy German intellectual institutions for more than 50 years. But the Germans have changed their system. If they were so very right once, may they not be right again? Hence the duty of educated persons to support the cause for which the Academic Assistance Council stands is clear. Enlightened self interest as well as humanity show the path.

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[1] The annual report of the Council was issued from its offices in Burlington House, London, W., on May 3rd.

ANNOTATIONS

A SAFE MILK-SUPPLY

THERE is at the moment a large and growing surplus of milk and, at the request of the Children's Minimum Committee, the Government are prepared to spend £500,000 to assist the provision of a daily milk ration for school-children. The Government also contemplate the spending of £750,000 to improve the milk-supply of the country. Opportunity is thus afforded of an increased consumption of milk, of improving the quality of milk produced, and of securing that the milk supplied shall be safe from disease. A special meeting of the Joint Tuberculosis Council was called on April 20th to discuss the question, the basis of discussion being provided by a memorandum prepared by Prof. G. S. Wilson. It was felt that in the incidence of tuberculosis of bovine origin we are behind other countries, notably the United States of America and Canada, and that the present occasion offered a unique chance for improvement. A resolution was passed welcoming the prospect of an increased milk consumption, but averring that the Government proposal to subsidise a milk ration for school-children should be supported only if the safety of the milk supplied is insured by adequate pasteurisation or boiling. Such an insured safety needs no advocacy. But all familiar with the problems—a greatly enlarged number of medical men and of the public we are glad to think—know the difficulties involved. Referring only to the question of pasteurisation, concerning which distinct differences of opinion prevail, attention must be drawn to the short clear words of Lord Dawson in a letter to the *Times* of Tuesday, reporting the views of the Royal College of Physicians of London on the subject. The College welcomes a daily ration of milk as important for the growth and health of children, affirms as considerable the risk of tuberculosis and other diseases following the consumption of raw milk, and concludes that the risk "could be obviated by the use of milk submitted to low temperature pasteurisation as defined in the official order," while pointing out that such pasteurisation does not materially alter the nutritive value. In this issue of THE LANCET an inquiry made by Mr. E. J. Pullinger, of the research institute of animal pathology of the Royal Veterinary College, gives the results of an investigation made to obtain further information into the extent to which milk on the market is contaminated with the organisms of tuberculosis and contagious bovine abortion. His report describes the methods adopted for testing and gives the arguments for arriving at valuable conclusions, one of which may be quoted in this connexion. It runs: Samples from 63 3000-gallon rail tanks were examined; all were contaminated with living tubercle bacilli and 53 with *Br. abortus*. In the corresponding milk samples after low temperature pasteurisation neither organism had survived.

FRENCH VIEWS ON RHEUMATISM

SINCE the last congress of the International League against Rheumatism, held in Paris in 1932, the French section of the League has greatly developed its organisation and has now produced a *Revue du Rheumatisme*. It is proposed to supplement the international *Acta Rheumatologica* by publishing periodically a selection from the large amount of material that is appearing month by month, particularly in France. The main objective of this review will be to issue well-considered and authoritative monographs on the various problems connected with the rheumatic diseases. We are glad to note that the work of rheumatologists in other countries, such as America, Germany, Sweden, and England, is given ample notice. Not only medical and therapeutic but social problems fall within its scope. Rheumatic disease has, in France also, a serious bearing on industrial welfare, and has even become an economic question. An interesting example of the medical-social activity that has sprung into existence in France in regard to crippling rheumatism is the Entr'aide des Rheumatisants, which has its headquarters in the Hôtel-Dieu. This was founded three years ago by a small group of voluntary workers, and has for its object to relieve the large numbers of bedridden and often destitute rheumatic persons "who are not seen because they cannot go out." The Entr'aide endeavours to discover their whereabouts, to provide a cure or at least some alleviation, to assist them financially as needed, and to obtain for them light work if possible and better conditions. The ultimate provision of special hospitals or homes is kept in view. Much can no doubt be done by governments, as in Sweden, to secure for the many sufferers from rheumatism the necessary medical and social services, at all stages of this long-drawn-out illness, but there is still much scope for personal and voluntary service in many directions, especially in crowded centres.

Four numbers of the new *Revue* have now appeared under the direction of various members of the French committee—the first by Prof. Besançon, chairman, with Dr. M.-P. Weil, of the committee; the second by Prof. Marcel Labbé, and the third by Prof. Etienne of Nancy. Besançon and Weil contribute a timely introduction to the pathology of the joints, in which the existing state of knowledge is impartially summarised and many moot points are discussed, such as the nutrition of articular cartilage. In another section the same writers present an interesting historical summary, showing the evolution of ideas on the nature of rheumatism. They are obliged to conclude that in spite of enormous efforts medical knowledge is scarcely yet at the beginning of the scientific phase, and that even clinical observation is wanting in precision and clarity. The long succession of medical writers and teachers have added fresh names to a complicated nomenclature more often than fresh knowledge. Although Hippocrates appears to have distinguished the arthritides from rheumatism, and rheumatism from gout, these early gains were lost in succeeding centuries. Sydenham in his time clearly defined gout, and like Cullen nearly a century later, returning to Hippocrates, recognised the independence of chronic articular rheumatism. These conceptions passing through many minds in the nineteenth century led on to the differentiation of rheumatoid and osteo-arthritis, which under various synonyms now rules in most countries. This cardinal distinction was emphasised by the British Ministry of Health in 1924. Besançon and Weil reflect the opinion of the French School in distinguishing between the infective arthritides and rheumatism, and regard rheumatic fever as a specific disease. Of rheumatoid arthritis the cause at present escapes all inquirers, but many factors probably operate and the influence of cold and damp is undeniable in predisposed persons.

Since the problem of causation is still unsolved, treatment however successful and approved by experience must still be called empirical. Iodine, sulphur, physical treatment, and waters hold the ground, the two last being, in the view of the French committee, the basis of the treatment of chronic rheumatism. Following Pemberton they favour the hypothesis that these agencies modify the circulation and nutrition through the sympathetic system. Opotherapy has its place in the arthritis of women and chrysotherapy with preparations of gold has a probable value on the analogy of its good results in tuberculosis. According to a prevalent French view, to which good observers in other countries are inclined, some forms of rheumatoid arthritis are at all events para-tuberculous.

The new reviews, issued under the auspices of acknowledged leaders in the medical profession in France, should help to increase the clarity and precision of statement for which in the scientific field that country is distinguished.

ANÆSTHESIA IN URINARY SURGERY

The diversity of opinion on the best method of anæsthesia for cystoscopy was a feature of the discussion on anæsthesia in urinary surgery, held at the Royal Society of Medicine on April 26th. Dr. H. W. Featherstone's opening address covered a wide field, and included in a critical survey all the drugs and methods commonly used. For cystoscopy he himself preferred some form of local anæsthesia and in this he was warmly supported by some of the succeeding speakers, the agent especially favoured being cocaine in 0·5 per cent. solution with 0·5 per cent. bicarbonate of soda. It was maintained by some that novocain was useless in the urethra; others attributed failure with this drug to the use of too weak solutions, the introduction of the endoscope too soon after the injection of the solution, or the Trendelenburg position which stretched parts that should be relaxed. In direct opposition to advocates of local measures was Prof. A. C. Pannett, the second speaker, who expressed a horror of carrying out endoscopy except under general anæsthesia, preferably gas-and-oxygen. Those who differed from him took the attitude that general anæsthesia was impossible in busy urological out-patient departments where very many cystoscopies had to be performed from considerations both of money and of time. Moreover, unless gas and oxygen for this purpose was given with the greatest skill the patient's straining tended to force the endoscope out, and moreover the view was liable to be obscured by congestion. A sudden cough or movement on the patient's part might bump the instrument against the surgeon's eye; surgeons did not often realise, said one speaker, what they owed to anæsthetists in immunity from black eyes after cystoscopy. With regard to pre-medication, several speakers pointed out how easily this practice might interfere with the value of the inspection by delaying or preventing efflux from the ureters. For minor procedures, including cystoscopy, the use of a small dose of a local anæsthetic inserted intrathecally at a low interspace had many advocates among those who had tried the method in out-patient practice with satisfactory results. An injection of 2 c.cm. of a 1 in 200 percaine solution, with the patient sitting up, had given, it was said, excellent results.

An alternative suggested was percaine in 1 in 500 solution as a local analgesic in the urethra for cystoscopy. If a few minutes were allowed to elapse after injection, and some of the solution was massaged into the posterior urethra, excellent analgesia was said to be obtained. The value of small intrathecal injection low in the spinal column before washing out the bladder had been found of especial value in acute cystitis affecting old women.

With regard to prostatectomy the preponderance of opinion was in favour of spinal analgesia with or without a basal narcotic, though here too there were advocates of gas-and-oxygen assisted by a basal narcotic, or with ether added as necessary. One authority disliked spinal injection and relied on local injection of 0·5 per cent. novocain into four points of the rectus sheath in order to secure the necessary relaxation. Most of those who alluded to the question preferred spinal to other methods for the removal of tuberculous kidney; and all seemed agreed on the need for complete insensibility of the tuberculous bladder when this was being examined.

AMENITIES AT A L.C.C. HOSPITAL

Lord Snell's first official act as newly elected chairman of the London County Council was to open last Friday a new reception block at St. Giles' Hospital, Camberwell. This hospital was one of those appropriated by the Council three years ago and, as was indicated to the guests at the opening ceremony, this appropriation has facilitated the admission of patients other than poor-law patients—of persons, that is, in the category of what may be termed the *lower paid wage-earners and their families.* Secondly municipal patients may, if suitable, be admitted on the certificate of their own attendant medical practitioner, and finally any urgent case is admitted at the medical superintendent's discretion. These new aims have introduced a very different atmosphere into the hospital of St. Giles and have required the provision of a reception block with all the facilities usual in a voluntary hospital. The upper floor of the new building provides quarters for a senior and four assistant medical officers; the ground floor is given up entirely to out-patients including antenatal cases; there is a theatre for minor operations and a new dispensary which will serve both out-patients and district medical work. A new and attractive entrance, with a porter's room adjoining, emphasises the attempt to mollify the first contact of illness to the sick poor of the neighbourhood. Mr. Somerville Hastings who, as chairman of the L.C.C. hospitals and medical services committee, supported Lord Snell, said it was his task to make patients comfortable and happy during their stay in hospital. Illness anyhow was an unpleasant time; in the past a standard had been set by the voluntary hospitals, but these, short of funds as they always were, had always put essentials first. Comfort was to be the note of the developing L.C.C. hospitals; at Camberwell, Lord Snell added, other amenities were to come—lifts, automatic house telephones, and cold storage were the next items contemplated. The honours of the occasion went easily to the nurses to whom each several speaker addressed his attention; the deputy-chairman of the Council remarked that any nurse was happy to be in so progressive a service, one in which merit surely led to promotion. The ideals so freely set out on this occasion will, if realised, provide Camberwell with a very agreeable hospital of its own.

THE OLDEST MEDICAL SYSTEM[1]

How far does medicine, as it develops, reflect the social conditions of a country would be a difficult question enough to answer in regard to our own country, where back history can be definitely ascertained and where dates can be put against the various advances in medicine corresponding with, for example, the general scientific progress of the world, the relations between our own and continental schools of thought, and the simultaneous reorganisation in the western world of ideals and performances following upon fundamental discoveries. Even so, to trace in any definite way connexions between effective legislation and social behaviour would be an elaborate task and the conclusions arrived at would frequently be diverse in the minds of many thinkers. But when the question is placed before the reader in connexion with the medicine of China, of which contemporary records exist from nearly 3000 B.C., he would be bold, it might be thought, who should attempt to trace the connexions between Chinese medicine and Chinese civilisation, so vast is that country, so old are its systems, and so various are the races which, by interpenetration and conquest, have fused themselves into what is termed the Chinese nation. Still in his small book Dr. Morse provides material enabling us to arrive at certain conclusions which point to the extraordinary fact that Chinese medicine for some 4500 years of its long drawn-out history remained the same in its conceptions, and was throughout infused with its original tenets of natural philosophy. As Dr. Morse says, after what has clearly been patient and learned investigation of all the available sources, Chinese medicine continued until comparatively recent times to rely on an unassailable cosmic theory, a rigid inelastic system entirely lacking in the quickening influences of a critical open-minded test method. The principles and practices of Chinese medicine are founded on their conception of cosmology. Theories and beliefs over three thousand years old constitute the basis for some of their most important diagnostic and therapeutic customs and practices to-day. In the bulky chronicle of the national medicine written some two years ago by Dr. Kimmin Wong, of Hong-Kong, and Dr. Wu Lien Teh, well known as a director of the Manchurian Plague Prevention Service and of the Chinese Quarantine Service,[2] will be found page after page of detailed information, much of which completes the story, whose headings are clearly set out by Dr. Morse. Until about 1000 B.C. beliefs in demons and mystical attributions to plants was codified into some sort of therapeutic scheme, when there arrived what are known as the Yin Yang principles, and the doctrine of the five elements. Dr. Morse shows that the underlying ethics of Chinese medical practice are still based on the notion of the Yin Yang, and sets out the theories or what may be called the mental mechanism of this scheme of duality. These chapters must be read to understand what follows and to gain some insight into the systems of anatomy and physiology which have prevailed in the country from prehistoric times until quite recently. Indeed, one would gather from Dr. Morse that throughout China generally, as far as the native practitioners are concerned, little advance has yet occurred. But the sadness of this view is relieved by a promise of better things. However local and sporadic the influences of scientific medicine in China may as yet be, there has been a distinct advance in the medicine of China as the result of comparatively recent English and American influences. The medical science of China will not be static for ever in the thraldom of past superstitions, and when modern learning becomes more diffused it would seem impossible that a nation, in whose philosophy so much that is fine and delicate can be observed, should not become prominent in the pursuit of medicine. Dr. Morse has written a valuable guidebook, which Messrs. H. K. Lewis and Co. are now prepared to distribute.

THE SCOPE OF PSYCHOTHERAPY

The Institute of Medical Psychology has published its first annual report[3] since moving into a larger and more suitable building in Malet-place. This report shows a conspicuous increase—about 50 per cent.—in the number of "patient-hours" of treatment given. For several months in the current year the Institute has again had to decline to accept further patients for treatment until it has worked through the list of those already interviewed and waiting. This state of affairs is readily understood by anyone who has charge of a hospital out-patient department where the difficulty in obtaining adequate psychotherapy for the patients who require this is universal. In those hospitals to which a part-time group of psychologists is attached the demands made upon this department are usually excessive, and even when only those patients most likely to benefit are accepted for treatment the waiting-list is long.

This report shows at least one way in which further experience should lead to some relief of the congestion. It shows that out of a total of 270 patients treated, only 58—or less than one-quarter—were regarded by the psychotherapists through whose hands they had passed as being either cured or much improved. When account is taken of the laborious nature of the treatment involved and of the claim that is made for it as being the only method that holds out a reasonable hope of cure or of satisfactory improvement, it is clear from these figures that a very large number of patients have not yielded the results which alone can justify the use of these methods of treatment. This is seen to be true of the majority of obsessional states, paranoid states, and sexual perversions. The low percentage of "cured" also illustrates the fallacy of referring to adults as cases of "early nervous disease"; in the class of patient for whom psychotherapy can claim its best results (the anxiety states) it is well recognised that the problems involved are usually connected with psychological disturbances early in the patient's life, and not at all recent in relation to the appearance of symptoms requiring treatment. In the children's department are to be found the only cases to which the term early can legitimately be applied, and the work of this department, which has been a continuously growing part of the Institute since its foundation as the Tavistock Clinic, is probably providing the most valuable results.

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[1] *Chinese Medicine.* By William R. Morse, M.D., LL.D. Paul B. Hoeber, Inc., New York (Clio Medica Series). London: H. K. Lewis and Co. 1934. Pp. 185. 7s.

[2] THE LANCET, 1932, ii., 1337.

[3] A copy of this report will be sent to anyone interested by the general secretary of the Institute, Malet-place, London, W.C.1.

An institute which hopes to rank on a par with hospitals providing other forms of treatment must be willing to give as much attention to diagnosis as to treatment, and to recognise that a flair for the sympathetic handling of patients is not always combined in one and the same person with the ability and the experience that are necessary for competent diagnosis. It is possible that a more critical weeding out of cases which experience has shown to be unsuitable would do more towards providing useful results than a mere extension of the facilities for the treatment of a larger number of patients of all types. In the meanwhile the Institute is making an increasingly valuable contribution to the problem of providing treatment for the mentally sick, and is an outstanding example of the success which rewards initiative and zeal even in the face of persistent financial difficulties.

A PRESENTATION TO SIR WILLIAM HODGSON

ON Sunday week, May 13th, on the occasion of his eightieth birthday, medical practitioners in the County Palatine of Chester will present Sir William Hodgson with a dedicatory volume entitled "Fasciculus Castriensis." It is an octavo volume of 300 or more pages, containing a brief biographical note of himself and more than 60 articles on clinical and other medical subjects written by practitioners in the county. There is also a statement of the clinical facilities offered by all the local health authorities in the county. The presentation copy will be bound in blue morocco, and will bear the arms of Cheshire and the badge of Æsculapius, while a few days later the volume, bound in blue cloth, will be distributed to all members of the Cheshire panel and will be then put on sale. Sir William Hodgson is chairman of the local medical and panel committee and of the county council, in which he has always been a champion of the general practitioner's status; he is still a practising member of the profession of which he is so distinguished a member.

A QUESTION OF ADVERTISEMENT

THE aim of the National Eye Service organised by the British Medical Association and the Society of Dispensing Opticians is to offer insured persons and their families, and others with family incomes not over £250 per annum, the chance of a consultation with an ophthalmic specialist of their own choice as an alternative to getting their glasses from a prescribing optician or attending a hospital. In many areas the scheme is now in good working order, but it is found to involve the necessity of a certain amount of advertisement, and has been objected to on that ground. In the Southampton area for instance six ophthalmic surgeons have joined the scheme and are willing to examine and prescribe for their patients either at the clinic or at their own consulting-rooms for the modest fee of half a guinea. An advertisement in the local paper announces the fact of the service having been organised, and a card giving names of the surgeons, with times of their attendances at the clinic, has been sent to all practitioners of the area requesting them to display it in their surgeries. It is felt by some that this amount of advertisement is unethical ("not in the best interest of the medical profession" in the words of one communication we have received); but, it may be asked who suffers from it? The general practitioner does not himself do eye work or if, having special experience, he does desire to do it and is qualified by the records of his attainment, he is free to join the scheme. Ophthalmic surgeons who are not on the list because they do not desire to see patients for half a guinea are not affected. Prescribing opticians may certainly be adversely affected, but the belief that opticians ought not to prescribe the glasses that they provide is a fundamental principle of the scheme. The scheme seems to us well calculated to meet the needs of the public and to offer the ophthalmic surgeon a valuable introduction to private practice.

THE SELENIDE TREATMENT OF CANCER

THE treatment of cancer patients who have been rejected by the surgeon and the radiologist is a very formidable problem. Dr. A. T. Todd is one of the few who have attempted to attack it in a systematic manner.[1] and in order to qualify for his treatment at the Bristol Royal Infirmary "every case has to be guaranteed untreatable and to be free of diagnostic doubt." Todd's working hypothesis is that the body reacts to the presence of a neoplasm by a defensive mechanism of which the macrophages constitute the most important part, and that this defensive mechanism can be stimulated by the intravenous injection of certain colloids in carefully adjusted doses and intervals. The first colloid used was a lead selenide preparation called D4S. Of the cases treated with this remedy, he states that "10 per cent. can be claimed as four-year cures," while 50 per cent. of the cases showed a definite prolongation of life, as a rule with comfort. A further development was the combined use of colloids and radiotherapy. For this purpose two new preparations were introduced: a double colloid of sulphur and selenium called SSe, and a feebly radio-active one made from radium residues and combined with selenium as in the original lead selenide colloid. The second preparation, which is called R.A.S., is but very feebly radio-active, and Todd has convinced himself by experiments on animals that its injection is without danger, no harm being apparent even after a long interval. The manufacture of these colloids has been entrusted to British Drug Houses Limited.

In applying the remedies the general aim is to produce an ionisation of the injected selenium colloid. The treatment begins with an injection of the sulphur-selenium followed by irradiation 48 hours later with X rays. This procedure is repeated weekly for about two months, the doses of the colloid and of the X rays being adjusted as as to produce a reaction. Next comes a course in which the two colloids SSe and R.A.S. alternate with one another, one injection being given each week; the feebly radio-active R.A.S. is supposed to produce ionisation of the selenium colloid. If the tumour reacts to this treatment this course of alternation of colloids is continued; if not, a second course of ionisation with X rays is applied three months later. The results Dr. Todd tabulates in two groups. The first comprises 93 cases treated from May, 1931, to September, 1932, and 15 of these are described as "apparent cures;" 10 of these patients are alive more than a year after the beginning of treatment. In addition there are 5 patients still under treatment and 2 of these are alive two and a half years and four years after the treatment commenced. The second more recent group of 62 cases has been treated since September, 1932; and here the results, as Todd himself says, are harder to assess. It contains 3 cases discharged as apparently cured and 9 cases still under treatment but doing well.

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[1] Brit. Jour. Surg., April, 1934, p. 519.

All this material is of course open to the obvious criticism that the time is too short to speak of a cure, or even of an "apparent cure"; and it is perhaps unfortunate that Todd should use the latter expression in speaking of his successful cases. But in any other of the diseases which are always fatal in their advanced stages, a form of treatment which in a certain proportion of cases will prolong life, remove pain and discomfort, and restore the patient for a long time to normal life would be thought a considerable achievement. Many of those who have seen the patients in Bristol are satisfied that, considering their hopeless state when they came under treatment, the results are remarkable. Dr. Todd may claim to have shown that cancer even in its most advanced stage is still sometimes amenable to successful treatment—in the sense in which that word is used for other diseases and provided that such treatment is applied with skill and devotion.

AMIDOPYRIN AND AGRANULOCYTOSIS

A FORTNIGHT ago we commented on the possible rôle of amidopyrin and the barbiturates in the causation of agranulocytosis. A further group of papers has since come to our notice which support the suggestion that these drugs are sometimes responsible for the condition. Randall[1] describes the case of a woman, aged 25, who developed acute and alarming leucopenia after the use of amidopyrin and barbiturates for simple headache. Hoffman and Butt[2] found that a feature common to 13 out of 14 cases of agranulocytosis was the use of amidopyrin either alone or in conjunction with a barbiturate; they also claim to have produced agranulocytosis in rabbits by the administration of amidopyrin alone. Lastly, Holten, Nielsen, and Transbol[3] in Denmark record a similar relationship between the use of amidopyrin and attacks of agranulocytosis. They describe six cases in which women developed typical agranulocytosis, while in hospital for some other condition, after treatment with amidopyrin, and they believe that agranulocytosis may really be a new disease dating from the introduction of the barbiturates and amidopyrin into therapeutics. During the period 1916–20 an analysis of 34,417 patients treated in a fever hospital in Stockholm shows no death attributable to agranulocytosis; during 1920–25 there were possibly five deaths from this cause, while between 1926 and 1931 as many as 26 cases were recorded. Dr. Holten and his colleagues again lay stress on the fact that there must be certain contributory factors such as personal idiosyncrasy, since in many cases long-continued use of the drugs in question does no harm. It would perhaps be wise, however, in view of the rapidly growing body of evidence that incriminates amidopyrin, not to give this drug unless the leucocyte count is controlled by frequent blood examinations.

THE BRITISH ASSOCIATION

THE annual meeting of the British Association for the Advancement of Science is to be held in Aberdeen from Sept. 5th to 12th. It is the third time that the Association has met there. In 1859 the Prince Consort presided and gave the inaugural address. In 1885 Sir Lyon Playfair was president. This year Sir William Hardy was to have presided, and when he died in January Sir James Jeans was appointed to take his place. His presidential address on Sept. 5th is entitled "The New World-Picture of Modern Physics." One of the evening discourses will be a memorial lecture for Sir William Hardy dealing with the preservation of foodstuffs; the other will be given by Prof. W. L. Bragg on the exploration of the mineral world by X rays. It is hoped to arrange an evening symposium on the general relation between science and the community. Many of the presidential addresses will bear on matters related to medicine. In the section of physiology Prof. H. E. Roaf will speak on colour vision; in the section of psychology Dr. Shepherd Dawson will take psychology and social problems for his subject; in the section of anthropology Capt. T. A. Joyce will tell of the origin and use of yerba maté, and in the section of zoology Dr. E. S. Russell will give an address on the study of behaviour. Other sectional addresses deal with physical methods in chemistry, the future of railway transport, sources of cheap electric power, and rural industry.

Aberdeen offers many attractions to the student. It is the centre of a great agricultural district and of an important fishing industry, while paper-making, granite working, and other industries are well established. Cultural and commercial interests in the city are, it is said, so happily balanced as to justify its ancient motto "Bon Accord." The Rowett Research Institute is easily reached. Preceding the meeting is an international geological excursion ending at Edinburgh on Sept. 3rd, when the Geological Society of Edinburgh celebrates its centenary. The detailed programme will not be issued until August, but those who intend to be present should notify the secretary of the British Association, Burlington House, London, W.1.

WE offer cordial congratulations to Dr. Helen Mackay, whose work on iron and other deficiencies in infancy and childhood is familiar to our readers, on being the first woman elected F.R.C.P. Lond.

NATIONAL INSTITUTE OF INDUSTRIAL PSYCHOLOGY.—Two public lectures will be given on May 7th and May 14th by Mr. F. C. Bartlett, F.R.S., professor of experimental psychology in the university of Cambridge, on recent researches into the effects of noise on work. Lord Horder will take the chair at the first lecture. Mr. J. W. Cox, D.Sc., research Fellow of the Institute, will lecture on May 28th on recent researches into the nature of manual skill. All the lectures will be given at 5.30 in the London School of Hygiene and Tropical Medicine, Keppel-street, W.C. They have been arranged under the Heath Clark bequest.

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[1] Randall, C. L.: Jour. Amer. Med. Assoc., April 7th, 1934, p. 1137.

[2] Hoffman, A. M., Butt, E. M., and Hickey, N. G.: Ibid., April 14th, p. 1213.

[3] Holten, C., Nielsen, H. E., and Transbol, K.: Ugeskrift f. Laeger, Feb. 8th, 1934, p. 155; March 1st, 1934, p. 245.

PROGNOSIS

A Series of Signed Articles contributed by invitation

V.—PROGNOSIS IN ECZEMA

A CYNIC has said that dermatologists are fortunate in that their patients never die and never get well. While skin disease in fact confers no immortality on its victim, there is the germ of a current belief in this quip. The popular impression that skin disease is exceptional in its resistance to treatment is contrary to the facts. That it is still held by many is partly explained by the nature of the lesion, which is essentially objective and therefore constantly under the view of the patient who is only satisfied when every trace of the eruption has been removed. Further, most forms of skin disease do not threaten life; therefore a person who may submit with fortitude to some considerable medical or surgical disability will be impatient with a disorder which does not greatly disturb his general health. He is worried in eczema by the itching or by the degree of the eruption which sometimes prevents him from following his occupation. His disease is his constant enemy; he resents its presence; he is eager to be rid of it and to be rid of it quickly.

It is therefore not surprising that the patient with eczema desires to be assured that he will be cured and seeks to know when he will be cured. The word "cure" is perhaps unfortunate because it connotes two entirely different things. We can cure syphilis and we can cure scabies because they are parasitic diseases the nature of which is understood. In eczema the eruption is merely a symptom; there are probably few forms of eczema in which the patient cannot be relieved, but in none of them is it possible to foretell what will happen later. The word cure therefore as applied to eczema can be used only in a limited sense.

Infants.—Eczema is met with at all ages. It is a common infantile complaint occurring especially between the second and the eighth month, rarely persisting after the second year. The prognosis in infantile eczema can thus be assessed with some degree of mathematical precision. There are other factors which bear upon the outlook: infantile eczema often reacts very favourably to treatment, such as a simple boric-zinc ointment or the more drastic crude coal-tar paste. Where either remedy proves suitable it is often remarkable how quickly even severe forms of the disease subside, and subside completely.

It is very important to differentiate between genuine infantile eczema, of which the prognosis is favourable as has been said, and an allergic eruption classified under the rather clumsy label of the eczema-asthma-prurigo complex with a similar propensity to develop early in life. This spurious eczema often mimics the genuine eruption, but sooner or later indicates its preference for the flexures, the bends of the arms and knees, the neck, and the skin behind the ears. The disease is often hereditary and more than one member of the family may be affected. A family history of asthma or hay-fever is also common, and when the complex is fully developed the skin eruption may alternate with attacks of asthma. It was formerly thought that nothing influenced the course of this chronic and persistent condition, but since the introduction of X ray therapy and intradermal vaccine therapy the prospects of improvement at any rate have become better.

Adults.—In adults eczema may present itself in an acute or in a chronic form. This is the common terminology; it is more useful, however, to speak of extensive and localised or limited eczema, for the acute and chronic phases may both be present at the same time in different regions of the skin. Local patches of eczema, for example on the legs, often respond readily if and when X ray treatment is available and suitable; otherwise they may persist for weeks or in exceptional cases for months. The extensive forms, especially those with an abrupt onset, as a rule pursue a relatively short course, provided the patient is willing to enter a hospital or nursing institution. When they are treated at home the improvement is much slower and much less satisfactory. Where the eruption consists wholly or principally of scattered œdematous papulo-vesicles, progress is slower than where confluent sheets of eczema are present.

With the object of obtaining more exact data I have reviewed a series of 50 cases of eczema, mostly of the severe or extensive type, admitted to my wards at Middlesex Hospital. The duration of in-patient treatment averaged at 5·4 weeks, the longest stay in hospital being 15·5 weeks and the shortest 1 week. This series illustrates the advantages of institutional treatment. Thus two patients with eczema of two years' duration were relieved in 4 and 3 weeks respectively, another of 18 months' duration in 3·5 weeks, and another of 9 months' duration in 4 weeks. It is not implied that the "cure" was complete in any but a very few of the 50 patients cited above. They were nevertheless sufficiently relieved to allow them to resume their occupations while attending the out-patients' department. In private practice rather more is demanded, and it may be estimated that treatment, even if institutional, will be increased to one and a half or even twice as many weeks.

The prognosis therefore in eczema, so far as it applies to any specific attack, is distinctly favourable. For the reason given above it is impossible to foretell what may happen in the future, except that a patient who has once developed eczema is liable to subsequent attacks.

UNCOMMON VARIETIES

Special reference should be made to other forms of eczema which have qualities distinguishing them from the common varieties of the disease.

Eczema of the legs associated with varicose veins is relatively often observed. The special technique originated by Mr. A. Dickson Wright has done a great deal to remove from the category of chronic complaints the forms associated with ulceration. Where the eczema is uncomplicated, however, the use of an elastoplast bandage is often followed by an aggravation of the eruption. Nevertheless it is obvious that the varicose veins, if neglected, continue to exercise a prejudicial effect on the skin condition. Where the veins are suitable for injection, or, failing this, where a supporting crêpe bandage is used, the prospect and degree of improvement is much better.

Dysidrotic eczema, where numerous small vesicles, often with pronounced itching, appear on the fingers, hands, and feet, is a seasonal and recurring eruption observed during the warmer periods of the year. Most of these cases are, in my view, eczematous, but a proportion are due to a ringworm or monilia infection; here the prognosis is much more favourable because the causal organism is susceptible to suitable parasiticides.

Mention should also be made of the *seborrhœic group* of dermatoses which includes dry psoriasiform lesions; sheets of red moist "eczema" of the axillæ, groins, and interdigital cleft and behind the ears; and an acute weeping or œdematous process more commonly found on the scalp, face, neck, and the thin skin over the bends of the joints. Where the condition is eczematised it follows the course of an acute eczema, with, however, a greater tendency to relapse. The form characterised by red moist areas of the groins and axillæ is often extremely rebellious to treatment. In this variety of seborrhœa there is a special predisposition to secondary invasion by staphylococci and streptococci; the resulting boils or impetigo-like lesions when present complicate and interfere with the normal process of treatment, and in this way prolong the duration of the eczema beyond its expected limits.

OCCUPATIONAL ECZEMA

Occupational eczema, in spite of the attention it has received in recent times, continues to be a controversial subject. Certain trades and occupations seem especially to predispose to eczema, or trade dermatitis as it is sometimes called. The eruption, which in form exactly resembles eczema, occurs on the parts of the body exposed to the irritant, and is met with in bakers, grocers, hairdressers, french polishers, and in other groups of workers. Prosser White, who gave special attention to these conditions, stated that if the patient discontinues the occupation for a time, he can safely resume it if the eruption is completely cured, but this is not the opinion generally held. In some cases the eruption clears up immediately contact with the irritant is discontinued, while in others it persists, often for months or years. The question of compensation involves a psychological factor and possibly causes the patient consciously or unconsciously to keep up the eczematous eruption by scratching or in other ways. Patients who suffer from seborrhœic disorders or from hyperidrosis seem especially prone to develop conditions of this sort and in them the prognosis is especially bad. The large question of sensitisation has also to be taken into account. In a person once sensitised his special reaction can be provoked by further contact with the offending agent, and therefore it is unlikely, in spite of the authority quoted above, that he will ever be able to resume an occupation in which the, to him, harmful substance is used.

CONCLUSION

Finally, it may be said that in the great majority, indeed in nearly all, of the different forms of eczema it is possible to cause the eruption to disappear, provided the patient is willing and able to give the necessary time and attention to the form of treatment indicated. The determination to get well which implies the subordination of a measured proportion of the day to the tedious details of treatment may be the determining factor; lack of such self-discipline invariably prejudices the favourable result.

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WORCESTER MATERNITY DEPARTMENT.—Mrs. Stanley Baldwin recently opened a new maternity department at Worcester Royal Infirmary. It is a compact unit composed of quarters made available by the recent extensions. The old theatre has been converted into a six-bed ward to which a labour ward, a nursery, and other accessories have been attached.

PUBLIC HEALTH

Unhealthy Office Accommodation

WOMEN clerks and secretaries met at Livingstone Hall on April 17th to consider the question of hygienic office accommodation. It will be remembered that the Offices Regulations Bill failed to obtain a second reading in the House of Commons last month. Dr. W. J. O'Donovan, M.P., who addressed the meeting, said it was necessary to convince not only Members of Parliament but also the older clerical workers who had become inured to bad conditions through long experience. In thousands of cases houses which had been built for dwellings had been converted for use as offices although quite unsuitable for the purpose. Mr. Arthur Greenwood, speaking as an ex-Minister of Health, said that the existing Acts were quite inadequate to ensure healthy conditions of office life. Factory workers had secured protection through collective action; unfortunately office workers in the past had been too respectable to agitate. A resolution was carried urging the need of legislation to secure a minimum health standard for office workers.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED APRIL 21ST, 1934

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 3 (last week 3); scarlet fever, 2781; diphtheria, 1060; enteric fever, 22; acute pneumonia (primary or influenzal), 1464; puerperal fever, 66; puerperal pyrexia, 149; cerebro-spinal fever, 34; acute poliomyelitis, 6; acute polio-encephalitis, 2; encephalitis lethargica, 11; continued fever, 1 (Willesden); dysentery, 5; ophthalmia neonatorum, 97. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on April 30th–May 1st was as follows: Small-pox, 11 under treatment [illegible] (last week 11 and 1 respectively); scarlet [illegible] 1654; measles, 3171 (last week 3420); [illegible] puerperal fever, 31 mothers (plus 9 babies); encephalitis lethargica, 259; poliomyelitis, 3; "other diseases," 150. At St. Margaret's Hospital there were 18 babies (plus 7 mothers) with ophthalmia neonatorum.

Deaths.—In 118 great towns, including London, there was no death from small-pox or enteric fever, 119 (54) from measles, 9 (2) from scarlet fever, 48 (9) from whooping-cough, 40 (10) from diphtheria, 37 (13) from diarrhœa and enteritis under two years, and 79 (16) from influenza. *The figures in parentheses* are those for London itself.

Measles is now definitely [illegible] this week there were 9 fatal cases in Liverpool, 7 [illegible] wcastle-on-Tyne and Salford, 4 in [illegible] caused 9 deaths in Liverpool, no m[illegible] at town except London. *Fatal cases of influenza were confined chiefly* to the northern area: Liverpool reported 7 deaths, Manchester 6, Sheffield 3—Birmingham also had 7 deaths. Four fatal cases *of diphtheria occurred* at Manchester, 3 each at Leeds and *Middlesbrough.*

The number of stillbirths notified during the week was 278 (corresponding to a rate of 39 per 1000 total births), including 49 in London.

PROVISIONAL DEATH-RATES FOR 1933

Provisional death-rates per million population for *England and Wales during the year* 1933 are now available as follows:—

	Males.	Females.	Persons.
Respiratory tuberculosis	819	571	690
Other tuberculosis	148	121	134
Cancer	1490	1559	1526

The maternal mortality (provisional) based on deaths primarily classed to puerperal conditions is as follows:—

Puerperal sepsis per 1000 live births 1·83; per 1000 total births, 1·75.

Other accidents and diseases of pregnancy and parturition per 1000 live births, 2·68; per 1000 total births, 2·57.

SPECIAL ARTICLES

THE INCIDENCE OF TUBERCLE BACILLI AND BRUCELLA ABORTUS IN MILK

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The main object of this investigation has been to obtain further information of the extent to which milk from tuberculin-tested herds and ordinary non-graded raw milk are contaminated with the organisms of tuberculosis and contagious bovine abortion. The survey of milk-supplies for *Br. abortus* has of recent years received impetus from the suggestion that the consumption of milk contaminated with this organism may produce undulant fever in human beings. The value of "low temperature" or "holder" pasteurisation for destroying bacteria of these groups has also been studied. Milk samples were obtained through the depôts of United Dairies (London) Ltd., through the kind coöperation of Mr. E. B. Anderson, M.Sc. One of the findings has been that, when ordinary raw milk is mixed in large quantities, living tubercle bacilli can be found in it almost constantly. This has stimulated interest in other questions, such as the reasons for such contamination and its extent. In the same connexion, milks from herds in two different parts of the country have been compared. Finally, the work has given an opportunity for studying various technical points connected with the recognition of tubercle bacilli and *Br. abortus* in milk.

The following classes of milk have been examined :—

1. MIXED MILK FROM INDIVIDUAL TUBERCULIN-TESTED HERDS

(*a*) *Certified milk.*—Pint samples, no doubt representing the mixed product from a few cows only, were tested.

(*b*) *Grade A tuberculin-tested milk.*—Samples were taken by trained laboratory personnel, who were daily engaged in such work. Two ounces of milk from each churn, delivered by a producer on the day of sampling, were mixed; and, after shaking, a half pint of the mixture was despatched to the Institute. Separate dippers were used for the milk of each herd.

2. MIXED MILK FROM ORDINARY HERDS

(*a*) *Rail tank milk.*—Pint samples of raw milk were taken from the inlet pipe of the holding chamber of the pasteurising plant, while this was being filled from a 3000-gallon rail tank containing the supplies of a number of producers. A corresponding pasteurised sample was taken from the outlet pipe of the holder 30 to 45 minutes after the collection of the raw sample. Samples from 7 pasteurising depôts were examined.

(*b*) *Raw mixed milk from single farms.*—An examination was made of the milk-supplies from two districts in England—viz., Cheshire (mostly during the spring of 1933) and Somerset (during the winter of 1933–34). Samples were collected in the same way as from Grade A tuberculin-tested herds. One hundred c.cm. amounts were bottled, packed in ice, and despatched to the Institute.

Examination for Tubercle Bacilli

Although much has been written about the presence of tubercle bacilli in market milk, it is not easy to estimate the percentages of the various classes of milk likely to contain this organism. Moreover, the figures available (Table I.) are difficult to evaluate owing to the different techniques used.

The literature referring to the survival of tubercle bacilli after pasteurisation is extensive but contradictory. It is generally agreed that when a modern pasteurising plant of the pre-heating holder type is worked in an efficient manner, tubercle bacilli are killed. When the plant does not work efficiently, however, some tubercle bacilli may survive pasteurisation. Thus, according to a report to the Manchester corporation (1931), 2 per cent. of pasteurised milks were found to contain living tubercle bacilli. J. Smith (1932) found 2·1 per cent. of 187 milks pasteurised by the holder method were contaminated. In the report (1933) of the Medical Research Council it is recorded that tubercle bacilli survived in 2·8 per cent. of 1243 samples after holder-pasteurisation.

TABLE I

Author.	District.	Class of milk.	Samples.	With tubercle bacilli.	With *Br. abortus.*	Milk yielding deposit (c.cm.).*	Guinea-pigs in test.
				Per cent.			
Wilson and Nutt (1926).	Manchester.	Market.	488	13·0	8·8	1D‡	1 or 2
Savage (1929).	Various counties.	,,	—	0 to 15	—	—	—
Smith (1932)	Aberdeen.	,,	279	10·3	28·3	25	2
Beattie (1932).	Edinburgh.	,,	83	—	34·9	25	2
Rabagliati (1932).	Yorks (W. Riding).	,,	720 527	2·5 3·8	— —	50	2
Wood (1930).	Somerset.	Herd.	—	2·2 to 2·5	—	100	1
Wood (1931).	,,	,,	379	—	1·0	100	1
Locke (1932).	Cheshire. Derbyshire.	,, ,,	437 141	18·0 8·5	— —	100	2
Rowlands (1933).	N. Wales.	,,	109	2·7	16·5	50	2
M.R.C. Rep. (1933).	Scotland.	,,	1534	10·0	—	50	2
Gaiger and Davies (1931).	—	,,	1218	7·3	—	100	2
Gaiger and Davies (1933*a*).	—	,,	2368	8·9	—	100	2
Gaiger and Davies (1933*b*).	—	,,	200	—	43·5	100	2
M.R.C. Rep. (1933).	Scotland.	Rail tanks.	201	37·5	—	50	2
THE LANCET (1933).	London.	,,	18	83·0	—	—	—
M.R.C. Rep. (1933).	Scotland.	T.T.†	714	0·1	—	—	2
C.M.O. Ann. Rep. (1931).	England and Wales.	,,	441 herds	8 samples.	—	—	—

Market milk = Ordinary mixed milk not definitely stated to come from one herd. — = Not stated. * Quantity of milk yielding the deposit injected into each guinea-pig. † Licensed T.T. herds. ‡ 1D = c.cm. of deposit.

TECHNIQUE

In deciding upon the inoculum to be used and period of incubation to be allowed, it had to be remembered that two kinds of organisms were being sought. Two guinea-pigs were used for testing each sample of milk, except with milks of classes 2 (*a*) and 2 (*b*). Apart from this, the same technique was used throughout.

After 1 c.cm. of gravity cream had been removed the milk was well mixed and 90 c.cm. were centrifuged at 2000 revolutions per minute for 30 minutes. The deposit was mixed with the gravity cream previously removed and the mixture was inoculated intramuscularly into one guinea-pig, half the amount being injected into each thigh. When two guinea-pigs were used, 2 c.cm. of gravity cream and the deposit from 180 c.cm. of milk were taken. As a rule, guinea-pigs were autopsied six weeks after inoculation, except with milk of class 2 (*b*) when the animals were allowed to survive four weeks only.

The same guinea-pigs were used both for the tuberculosis and *Br. abortus* tests, since, according to Wilson and Nutt (1926), these two infections can develop coincidentally without the one influencing the other. After material had been taken for the *Br. abortus* examination, the organs were examined for tuberculous lesions, and smears were taken for microscopic examination. Cultures were made from the regional lymphatic glands and spleen. The ground-up material was mixed with an equal volume of 20 per cent. antiformin and loopfuls, seeded on plain egg or broth egg slopes, after intervals of five and eight minutes.

The technique in this investigation can be regarded as severe. The relatively low speed of centrifuging is perhaps open to criticism, but it is probably offset by the inclusion of gravity cream in the inoculum. The work was completed before the recent report (1933) of the Medical Research Council was published, according to which living tubercle bacilli in pasteurised milk would have been missed in 35 out of 57 instances if both guinea-pigs had been killed after four weeks. Reliance, however, was placed upon naked-eye appearance of the organs; whereas in this work cultures were made from the glands.

The strains of mycobacterium isolated were not typed, but none of the cultures showed the rapid growth and other features characteristic of avian and saprophytic forms. This bears out the findings of Wilson and Nutt (1926) and Gaiger and Davies (1933 *c*) that the non-pathogenic acid-fast bacilli common in milk products do not produce a condition in guinea-pigs simulating tuberculosis; and it is contrary to the findings of Albiston in Australia (1930), who recorded that 9·3 per cent. of cases of apparent tuberculosis in guinea-pigs, inoculated with milk, are caused by a saprophytic acid-fast bacillus.

TABLE II

Examination of milk from tuberculin-tested herds for tubercle bacilli and Br. abortus

Class of milk.	Number of herds examined.			Total of samples examined.	T.B.		*Br. abortus.*	
	3 times.	Twice.	Once.		+	–	+	–
Certified ..	11	3	5	44	0	44	28	16
Grade A (T.T.) ..	14	3	9	57	1	56	42	15
Total ..	25	6	14	101	1	100	70	31

TABLE III

Examination of ordinary milk for tubercle bacilli and Br. abortus

Class of milk.	Source.	Samples examined.	T.B.		*Br. abortus.*	
			+	–	+	
Rail tank raw.. ..	7 depôts.	63	63	0	53	10
Rail tank pasteurised	,,	63	0	63	0	63
Herd samples	Cheshire.	105	22	88	39	66
,, ,, ...	Somerset.	104	2	102	20	84

From Tables II. and III. it is seen that :—

1. Of 101 samples from 45 producers, only 1 contained living tubercle bacilli. (*a*) *Certified milk.*—Forty-four samples from 19 producers were tested, the milk from 11 of the herds being examined three times at intervals of 4 months. With one doubtful exception all were free from tubercle bacilli. (*b*) *Grade A* (*T.T.*).—Fifty-seven samples from 26 producers were tested, milk from 14 of the herds being examined three times at intervals of 4 months. One sample contained living tubercle bacilli.

2. (*a*) *Rail tank milk.*—All 63 samples examined contained living tubercle bacilli. In the corresponding pasteurised samples these organisms were not detected. (*b*) *Raw mixed milk from single farms.*—Out of 105 samples from Cheshire, 22 (21 per cent.) contained living tubercle bacilli. Of 104 samples from Somerset, only 2 (1·9 per cent.) contained this organism.

TUBERCLE BACILLI IN MILK MIXED IN LARGE QUANTITY

The finding that when ordinary farm milk is mixed in sufficiently large quantity, the whole becomes contaminated with tubercle bacilli in detectable numbers is, perhaps, somewhat surprising. It is usually estimated that not more than about 0·2 per cent. of all cows are affected with tuberculosis of the udder and contamination of milk with tubercle bacilli is therefore probably due to this small proportion. Thus there was the possibility that when large volumes of milk were mixed the chance of finding tubercle bacilli, even by the sensitive guinea-pig test, in 90 c.cm. samples taken at random would disappear. The findings to the contrary might be explained in one or both of two ways: (1) that the percentage of cows excreting tuberculous milk is much higher than is generally believed; (2) that one cow with tuberculous lesions in the udder can contaminate a vast bulk of clean milk. While the second explanation appeared the more probable, an investigation was deemed advisable; but before making it, information was desired as to the extent to which the bulk milk itself was contaminated.

Tubercle bacilli in mixed bulk milk.—Starting with 25 c.cm. of rail tank milk, dilutions were made at 1 in 10, 100, and 1000 with milk from a cow which had passed the tuberculin test. The usual technique was adopted, two guinea-pigs being used for each dilution and for a suitable control of the tubercle-free diluent.

Two samples of tank milk from each of three receiving depôts were examined. In one case the undiluted milk alone was positive; in four instances the milk was still infective in the tenfold dilution; and in the remaining instances as far as the hundredfold dilution.

Extent to which milk from tuberculous udders is infective.—Osterman (1908) found that milk from a tuberculous udder could be diluted 50,000 times and still be infective.

Thanks to the kindness of Mr. D. S. Rabagliati, chief veterinary inspector for the West Riding, milk samples were received from 3 tuberculous udders. These were diluted at 1 in 100, 10,000, and 1 million with tubercle-free milk. In one instance the mixture was infective to the second dilution. In the second and third experiments the mixture was infective to a dilution of 1 in 1 million.

Examination for Brucella Abortus

Some of the results obtained by previous workers, who examined ordinary milk-supplies for *Br. abortus*, are recorded in Table I.

I am unaware of any important series of samples from tuberculin-tested herds which have been examined for *Br. abortus*, although several authors report having found these organisms in such milk. In establishing the presence of the organism in milk, technical methods are important. Thus, Huddleson, Hasley, and Torrey (1927) and Carpenter and Baker (1927) found that the organisms were most numerous in gravity cream; Fitch and Lubbehusen (1926) considered that sediment was the best inoculum, though they thought it safer to use whole milk as well. Karsten (1932), Pröscholdt (1932), and Stockmayer (1933) advocated the use of whole milk for the cultural isolation of brucella. For guinea-pigs, Karsten and Bischoff (1933) recommended a mixture of gravity cream and sediment.

An incubation period of six weeks in the guinea-pig seemed necessary in view of the findings of J. Smith (1932), who in 246 instances noted 43 where agglutinins began to appear four weeks after inoculation with milk containing *Br. abortus*. Ten instances were also noted where agglutinins disappeared before the eighth week. Sheather

923) always found agglutinins within six weeks of ijecting contaminated milk. Smith used the deposit om 25 c.cm. of milk for each guinea-pig and the tardy ormation of agglutinins and their early disappearance iay have been due to the very small numbers of brucella ioculated. Thus Hagan (1922), using high dilutions of ılture, noted the appearance of agglutinins as early as ie second week.

TECHNIQUE

In testing for *Br. abortus*, two methods were used—iz., guinea-pig inoculation and agglutination test of the hey.

(1) At autopsy the spleen was first removed for cultural xamination and heart blood was then taken for an gglutination test. The tissue was ground up in 0·5 c.cm. f broth, and the suspension seeded on a plate of 5 per cent. iorse serum agar or 5 per cent. potato extract agar which ras incubated at 37° C. in a 10 per cent. CO_2 atmosphere. Plates showing no growth after three days were reincubated or four more days. Colonies resembling those of brucella vere tested with specific agglutinating serum. Guinea-pig era were tested with *Br. abortus* suspension (Strain 45), qual in density to Brown's $BaSO_4$ tube No. 5, in dilutions rom 1 in 10 to 1 in 10,240. With milks from non-graded ierds reliance was placed entirely upon agglutination ests of guinea-pig sera.

(2) Milk whey was prepared by the rennet method and ested for agglutinins in dilutions from 1 in 10 to 1 in 640.

From Tables II. and III. it will be seen that :—

1. Of 101 milk samples from 45 tuberculin-tested herds, 70 were positive. (*a*) *Certified milk.*—Of 44 samples, 28 were positive (24 by the guinea-pig test and 4 by agglutination test of milk whey). (*b*) *Grade A* (*T.T.*).—Of 57 samples, 42 were positive (40 by the guinea-pig test and 2 by agglutination test of milk whey).

2. (*a*) *Rail tank supplies.*—Of 63 samples of raw milk, 33 were shown to contain living brucella by the guinea-pig test, whilst in 20 others the whey contained agglutinins for these organisms. There were thus 53 positive samples. The pasteurised samples were apparently free from living brucella. (*b*) *Ordinary raw mixed milk from single farms.*—Of 105 samples from Cheshire 39 (37 per cent.) contained living *Br. abortus*, while of 104 samples from Somerset 20 (19·2 per cent.) were positive.

OBSERVATIONS ON THE TESTING OF MILK FOR BR. ABORTUS

During the investigation an opportunity was taken to obtain information on the following points: (1) the relative values of the guinea-pig and whey agglutination tests; (2) the advantage of using two guinea-pigs for each sample; (3) serum agglutinin titres in inoculated guinea-pigs; (4) diagnosis of the disease in guinea-pigs by cultural and serological methods.

TABLE IV

Comparison of guinea-pig and whey agglutination tests

Class of milk.	Samples.	Whey +. G.P. +.	Whey −. G.P. +.	Whey +. G.P. −.
Graded ..	70	47	17	6
Ordinary ..	47	19	8	20
Total ..	117	66	25	26

G.P. = guinea-pig.

(1) Pröscholdt (1932) recorded that in 16·4 per cent. of 4911 instances the whey agglutination test was positive and the inoculation test negative. In the present investigation, out of 117 instances both tests were positive 66 times, the guinea-pig was positive and the whey negative 25 times, and the guinea-pig negative and the whey positive 26 times (Table IV.).

It is seen that with rail tank milks the inoculation test failed, in nearly half the cases, to reveal *Br. abortus*, although this organism was certainly present. On the other hand, with the better-class milk the inoculation test was more sensitive than the whey test.

(2) The use of two guinea-pigs for each sample is intended, (*a*) to reduce the losses from premature deaths, and (*b*) to decrease errors due to failure of guinea-pigs to become infected owing to the small numbers of *Br. abortus* in the sample, or owing to individual guinea-pigs being abnormally resistant to brucella.

(*a*) The proportion of premature deaths amongst guinea-pigs inoculated with the various classes of milk is shown in Table V. The mortality differences between the graded and rail tank classes are not significant and may be due to chance alone. The numbers of raw and pasteurised samples compared were not large enough to furnish definite conclusions; but it is quite likely that if larger numbers had been available the differences would have been significant. No significant difference in mortality following the inoculation of herd samples collected during warm or cold weather was noted.

TABLE V

Premature Deaths of Test Animals

Class of milk inoculated.	Total used. G.P.'s.	Number lost through intercurrent infections.	Percentage losses.
Raw graded	184	12	6·5
Raw rail tank	78	9	11·5
Pasteurised rail tank ..	78	2	2·6
Herd samples	200	17	8·5

(*b*) Gaiger and Davies (1933 *b*) found brucella infection in a single guinea-pig in 35 out of 87 cases where the animals had survived the full time allotted. J. Smith (1932) killed the first guinea-pig after an incubation period of four weeks and the second after an incubation period of eight weeks, and found in 63 out of 246 cases infection in one guinea-pig alone. In my series out of 66 instances in which two inoculated animals survived the full time, there were eight where a single animal became infected. The use of two guinea-pigs is therefore desirable.

(3) A total of 123 guinea-pigs inoculated with milk containing *Br. abortus* developed agglutinins as follows :—

Serum titres.	1 : 10	1 : 20	1 : 40	1 : 80	>1 : 80
No. of G.P.'s.	2	2	15	11	93

It may be noted that the organism was isolated culturally from both guinea-pigs with titres of 1 in 10. This finding, together with the evidence in the literature dealing with the absence of normal agglutinins for *Br. abortus* in the guinea-pig, supports the view that a titre of 1 in 10 indicates infection. The titres can be classified according to the class of milk noculated.

Class of milk.	No. of G.P.'s.	Serum titres	
		1 : 10–1 : 80	over 1 : 80
Graded	117	18	99
Ordinary	34	15	19

Blood-sera from nine guinea-pigs, which showed infection following inoculation with Grade A (T.T.) milk, were taken at weekly intervals to find the earliest time at which agglutinins would develop. The result showed that in four guinea-pigs agglutinins were present by the fourteenth day and in the remaining five by the twenty-first day. Agglutinins persisted in all animals to the forty-second day and in the six surviving pigs to the sixty-third day.

(4) To compare the relative values of the blood agglutination test and of culture of guinea-pig tissues for diagnosis, the results should be classified, as follows, according to the grade of milk.

Class of milk.	No. of G.P.'s.	Agg. +. Culture +.	Agg. +. Culture −.	Agg. −. Culture +.
Graded ..	128	112	12	4
Ordinary ..	40	11	26	3

Agg. = agglutination.

It will be seen that in 7 (4·2 per cent.) of 168 cases, cultural methods revealed infection, although there was no appreciable formation of agglutinins. This agrees fairly closely with J. Smith (1932), who found 5 (4 per cent.) out of 123 guinea-pigs, and Gaiger and Davies (1933 *b*) 1 (2·4 per cent.) out of 41 positive by culture but not by the agglutination test. The value of conducting a test of the blood-serum is particularly evident in the case of milks of higher bacterial count.

General Discussion

It has now become an established fact that when milk is bulked in large quantities the whole is contaminated with tubercle bacilli. This is evidently due to the fact that the number of tubercle bacilli excreted in the milk of a single cow is very high. From the point of view of safety this is not of great consequence if the milk is pasteurised, as is the case, for instance, with 95 per cent. of London milk. This work has again clearly demonstrated the efficiency of holder pasteurisation, so that the presence of living tubercle bacilli in pasteurised milk must indicate inefficient heat treatment, or even possibly the addition of raw milk.

The differences in the percentages of tubercle bacilli and *Br. abortus* in milk samples from Cheshire and from Somerset suggests that the number of cows suffering from udder tuberculosis and contagious abortion is relatively higher in Cheshire. Thus according to data by Messer (1932), in 1928 the cow population per 1000 acres was 235 in Cheshire and 138 in Somerset. The herds may therefore be larger in the former county, and the larger the herd the greater is the chance of its containing animals excreting tubercle bacilli and *Br. abortus*. The assumption that herds are larger in Cheshire receives support from the data regarding the quantities of milk supplied by the producers on the day of sampling; thus, for Cheshire, the average daily supply was 56 gallons per herd compared with 21 for Somerset. Another point is that of the 24 herds producing tubercle-contaminated milk, 19 were supplying a gallonage above the average for their district. On the other hand, it is possible that the incidence of these diseases is really higher in Cheshire, since the denser the population the greater the chance of the disease spreading, especially where owing to the climatic conditions it is the custom to house stock for relatively long periods.

Taken at their face value, the figures for milk samples from tuberculin-tested herds suggest that the proportion of tuberculous contamination was as high as in the ordinary milk-supplies from Somerset. This, however, cannot be accepted as the case. The examination of the tuberculin-tested herds was far more exacting. Thus, out of 45 tuberculin-tested herds 25 were examined three times at intervals of four months, whilst six were examined twice and were always found to be uncontaminated, whereas the herds from Somerset were examined once only.

The fact that undulant fever in man is frequently due to the consumption of milk containing *Br. abortus* is now well established. Whilst there are a number of figures available as to the presence of this organism in market milk, no extensive examination of milk from officially tuberculin-tested herds has so far been reported.

The figure (70 per cent.) found for milk from tuberculin-tested herds is much higher than any previously reported for ordinary milk, but this cannot be held to imply that the incidence of contagious abortion is greater in tuberculin-tested herds. It would appear that the quality of the milk under test has not been given the attention it deserves, since the detection of *Br. abortus* in mixed milk presents certain difficulties. It seems that the apparent higher incidence of *Br. abortus* in milk from clean herds is due to its lower content of saprophytic bacteria. It must be accepted, for instance, that every rail tank sample in the series contained these organisms and yet they could only be isolated from half the number of tanks. Fortunately in the case of high count milk containing *Br. abortus*, direct agglutination tests of the whey are of value for diagnosis. The titre accepted as positive in this work was 1 in 10, as in the case of blood-sera from inoculated guinea-pigs. Karsten (1932) and Klimmer (1932) took a whey titre of 1 in 20 in mixed milk as evidence of contamination, but they do not give details of the density of the bacterial suspensions used.

The reason why this organism cannot be easily isolated from milk of high bacterial count is for the moment a matter for speculation. It may be that *Br. abortus* is killed by the acids produced by saprophytic bacteria; but this does not seem to be the explanation, since guinea-pigs inoculated with such milk sometimes showed high specific agglutinin titres, although *Br. abortus* could not be isolated from their tissues. *It is more probable that tissue reactions* set up in the guinea-pig by the inoculation of large numbers of saprophytes may cause premature death of small numbers of *Br. abortus* inoculated. This is supported by the observation that the specific agglutinin titre of blood of guinea-pigs inoculated *with dirty milk is usually lower than that of* guinea-pigs inoculated with clean milk.

Summary and Conclusions

1. Out of 101 samples of milk from 45 tuberculin-tested herds, 1 contained tubercle bacilli and 70 *Br. abortus*. With most herds three examinations were carried out at four-monthly intervals.

2. Samples from 63 3000-gallon rail tanks were examined; all were contaminated with living tubercle bacilli and 53 with *Br. abortus*. In the corresponding milk samples after low temperature pasteurisation neither organism had survived.

3. Samples of raw rail tank milk had to be diluted from 10 to 1000 times before tuberculous infectivity for guinea-pigs was lost.

4. Samples of udder milk from cows with tuberculous mastitis could be diluted one million times, with clean milk, without their infectivity for the guinea-pig being destroyed. This explains why rail

tank milk is almost always contaminated with tubercle bacilli.

5. Of milk samples from 105 non-tuberculin-tested herds in Cheshire 22 contained tubercle bacilli and 39 *Br. abortus*. Of 104 samples from similar herds in Somerset 2 contained tubercle bacilli and 20 *Br. abortus*. The significance of these figures is discussed.

6. Premature deaths amongst guinea-pigs inoculated with milk ranged between 6 and 12 per cent., depending on the class of milk under test. Hence, the use of duplicate animals is desirable.

7. Specific agglutinins for *Br. abortus* may appear in the blood of guinea-pigs two to three weeks after inoculation of infected milk and a titre as low as 1 in 10 may be accepted as evidence of infection. Isolation of *Br. abortus* from guinea-pigs, whilst theoretically the more convincing proof of infection, presents technical difficulties, which may render the method less reliable than the demonstration of specific agglutinins.

8. Contamination of clean milk with *Br. abortus* can generally be demonstrated without difficulty by culture from the guinea-pig, or by the demonstration of agglutinins. It is often difficult to demonstrate contamination of dirty milk by the guinea-pig test and in such cases direct agglutination tests of the whey may be used.

9. This work emphasises the need for an extensive campaign for the eradication of tuberculosis and contagious abortion. Eradication schemes must of necessity proceed slowly, and as an immediate palliative efficient pasteurisation of milk can be relied upon to destroy pathogenic organisms found in milk.

I wish to thank Dr. F. C. Minett for advice and criticism during the course of this work. I am also indebted to the directors of the United Dairies Limited for their interest and financial support.

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ROYAL WEST SUSSEX HOSPITAL.—During the past ten years the annual deficit of this hospital has averaged £1581 and in 1933 it was £2962. At the annual meeting held at Chichester on April 3rd, it was decided to raise a loan of £6000 from the bank. A resolution was passed abolishing in-patients and out-patients' letters. The income for the year was £12,932, and the expenditure showed an increase of £2800, of which £1100 was non-recurring.

AUSTRALASIA

(FROM OUR OWN CORRESPONDENT)

SYMPATHETIC RAMISECTION

FOLLOWING the report published in THE LANCET of July 19th, 1930, on the value of ramisection in the treatment of spastic paralysis, an editorial appeared in the *Medical Journal of Australia* suggesting that the matter should be further investigated in Australia. The Royal Australasian College of Surgeons, adopting this suggestion, appointed a subcommittee in Melbourne to make an investigation and appointed as its members: A. E. Coates, J. B. Colquhoun, R. M. Downes, C. W. B. Littlejohn, Fay Maclure, Dr. H. F. Maudsley, Sir Richard Stawell, H. Douglas Stephens, Dr. O. W. Tiegs (coöpted), H. C. Trumble, and Prof. F. Wood-Jones. Dr. Coates acted as secretary and Prof. Wood-Jones as chairman.

This committee have now issued their report (Med. Jour. Australia, March 17th, 1934, p. 384). They considered the anatomical and physiological evidence for the existence of a sympathetic supply to striated muscle, reviewed the experiments of Hunter and Royle, and examined the clinical evidence afforded by cases in which ramisection had been done. They have come to the conclusion that there is no definite evidence of a dual innervation of striated muscle—indeed there is much to the contrary—or of the control of muscle tone by the sympathetic nervous system. On the other hand there is evidence of a relation between the sympathetic nervous system and the fatiguability of muscle. Recent work seems to show that there may be a humoral origin for the phenomenon. The absence of any effect of sympathectomy on tetanised muscle seems to exclude this procedure as being of use for the relief of spasm.

The committee were further of the opinion that the operation of sympathetic ramisection is of no permanent value in the treatment of spastic paralysis and that such improvement as may occur can be attributed to psychic effects, together with an appreciation of a warmer limb due to vascular changes. They hold that there is some danger of ascribing to the operation of ramisection certain improvements in the patient's condition which are really due to ancillary measures, such as tenotomies, massage, and rest in bed. They point out in conclusion, however, that the work of Hunter and Royle has not been for nought, since it has been the stimulus of much research, and that special credit is due to Dr. Royle for his elaboration of the operative technique of surgical interference with the sympathetic nerve-supply.

DEATHS FROM CANCER

The statistics issued by the Commonwealth Government for 1932 show that, whilst the death-rate from all other causes has decreased, that from cancer has increased from 74 per 100,000 in 1911 to 105 per 100,000 in 1932. The actual number of deaths from this cause in 1932 was 6875 (3696 males and 3179 females), the largest number occurring in persons between 65 and 75 years of age. Deaths from tuberculosis numbered 3004, compared with 3726 in 1911.

Figures from New South Wales reveal the same general trend of deaths. In 1931 2439 persons died of cancer (972 per million living), the rate being 4 per cent. above the average of the preceding quinquennial period. In 1932 the deaths numbered 2534, equal to a rate of 1001 per million living and 6 per cent. above the average of the preceding quinquennial period. The death-rate from this disease has been steadily increasing in the State and the graph shows an almost straight line from 25 per 100,000 in 1883 to 100 in 1932. During the same period the graph for tuberculosis shows a decline in an almost straight line from 143 to 41 per 100,000.

POST-OPERATIVE TETANUS

In January of last year I referred to certain post-operative deaths from tetanus in New South Wales. The Minister for Health subsequently issued a memorandum to all hospitals recommending the preparation of catgut by the iodine method, instead of the biniodide which was in common use; but in spite of these precautions two further deaths from tetanus following operation have been the subject of coroners' inquiries. In the first of these, tetanus bacilli were found in the wound and, as is usual in such cases, the catgut was held responsible although the chain of evidence was far from complete. In the latest case, however, it appears to be beyond question that the catgut should be absolved from any blame—or at anyrate the catgut used in the most recent operation. The patient died from tetanus on Jan. 3rd, 1934, seven days after a laparotomy. She had had two previous operations on the same site. Microscopical search of various tissues failed to reveal tetanus bacilli, and although some organisms resembling them were found they did not reproduce the disease in guinea-pigs. The whole of the jar of catgut, containing 11 spools, used at the operation was subjected to exhaustive tests. These had all been sterilised with iodine by the Bulloch method and were found to be sterile except that from one spool a bacillus of the *subtilis* type was isolated. This was thought to be an air-borne or accidental contamination. The coroner found that there was no doubt that the catgut used was sterile and that infection occurred apart from the operation. During the hearing attention was drawn to the fact that in the recent cases of post-operative tetanus the operations were all abdominal.

The tests of catgut which have been carried out as a result of these deaths seem to indicate that the biniodide method does not give a sterile gut, and that in this respect the iodine method is preferable. The latter has now been adopted almost generally in New South Wales.

IRELAND

(FROM OUR OWN CORRESPONDENT)

THE TEMPORARY ECONOMIES

IN the Senate last week the Minister for Local Government and Public Health announced his acceptance of the Senate's amendment excluding all medical officers from the provisions of the Local Services (Temporary Economies) Bill. It is to be noted that the amendment saves from deductions not only the dispensary medical officers, but also the whole-time medical officers such as county medical officers of health, county hospital surgeons, and the medical officers of mental hospitals.

DEATH OF DR. BRENDAN MACCARTHY

Dr. Brendan MacCarthy, a former medical inspector of the Local Government Board, Ireland, died at his residence at Ballsbridge, Dublin, last week. Educated at Trinity College, Dublin, whence he received his medical qualifications in 1889, MacCarthy was still a young man when he was appointed a medical inspector under the old Local Government Board. He saw service in many districts of Ireland, and was known as a conscientious, capable, and courteous official. His name came prominently before the public in 1901, when he was associated with Dr. William Smyth, of Burtonport, Co. Donegal, in a heroic action associated with Dr. Smyth's death. An outbreak of typhus fever had occurred on Arranmore Island, which lay in Dr. Smyth's district, although several miles from the mainland. It became necessary to transfer some of the patients from the island to the workhouse hospital at Glenties. The local boatmen had such a dread of the fever that none could be persuaded to give their services. MacCarthy and Smyth themselves manned a boat, carried the patients in their own arms, and rowed the boat to the mainland over a stormy and threatening sea. Smyth contracted typhus and died. The Arnott medal was subsequently presented to Brendan MacCarthy for his share in the incident. He retired from the public service some years ago.

BACTERIOLOGY OF CHRONIC RHEUMATISM

At a meeting of the Ulster Medical Society on April 19th, Sir Thomas Houston read a paper on chronic rheumatism, with special relation to the rôle of enterococci. The president, Prof. W. J. Wilson, occupied the chair, and there was a particularly full attendance of members and fellows. The speaker discussed the various classifications of chronic rheumatism which have been brought forward and suggested that in spite of the variety of the clinical types there may be a basal or specific infecting organism. He drew an analogy with tuberculosis, another disease with protean clinical manifestations. In America, he said, various workers had contributed to the long-held view that streptococci and rheumatism are associated. Several types of organism had been incriminated, but he felt it wrong to suppose that a definite clinical entity could have several causal organisms. Recent studies with the bacteriophage carried out by Sir Thomas Houston had supplied a partial explanation, for in the presence of phage the morphological character of organisms, particularly streptococci, changed.

Turning to the rôle of enterococci, he said that in chronic rheumatism these were often found in septic foci—e.g., in the tonsil or urinary tract. An appreciable number of subjects gave a positive agglutination when their serum was tested with one or other type of enterococci. In some of the more acute forms of rheumatoid arthritis he had cultured enterococci from the joint fluid. A final argument was the sensitiveness of patients suffering from chronic rheumatism to enterococcal vaccines. Sir Thomas discussed the manner in which these organisms may be differentiated from all other streptococci, and produced evidence that their character could be made to change so that they might resemble the *Streptococcus viridans*. Such changes were liable to take place when enterococci were artificially infected with phage.

DUKE OF ATHOLL'S FUND.—The distribution of this fund began last week. The first list of beneficiaries contains the names of 116 hospitals and charities in England, Wales, and Northern Ireland; to Scotland a lump sum of £10,000 has been allotted. The total sum distributed amounted to £45,200. In compiling the list the Duke was advised by Lord Moynihan and Major-General Sir Wilfred Beveridge.

MEDICINE AND THE LAW

An Injured Policeman: Gallantry or Contributory Negligence?

IN a case where a police constable had been injured while stopping runaway horses in a crowded street Mr. Justice Finlay had last week to decide whether in such an emergency the ordinary normal man is likely to be impelled towards altruistic gallantry or towards a selfish inaction. It is prima facie negligence to leave horses and carts unattended in the highway if they afterwards bolt and injure people. The owners of the runaway van, however, taking a somewhat rigid view of the legal position, contended that the constable had been guilty of contributory negligence in what he did: he need not, they said, have put himself in jeopardy; he voluntarily assumed the risk. The constable answered that it was his duty to protect life and property. When he saw the impending danger, he was looking out of the window of the police station and thus was not on traffic regulation duty; he just acted in accordance with his general obligation towards the public, ran into the street, pushed a woman aside into safety, and stopped the runaways. The court observed that, if anyone is negligent, he is responsible for all the natural consequences of such negligence. Was the policeman's brave act a natural consequence of the van-owner's negligence in leaving the horses unattended? Yes, said the judge; if a horse runs away, it is obvious that people may be knocked down and that somebody will try to stop the animal in order to prevent injury to life and limb—"one must have regard not only to the victim but also to the rescuer." Judgment was given for the policeman with costs so that he will not suffer for his courage.

How are people likely to act in emergency? Ten years ago Mr. Justice Swift tried a case where, by the defendants' negligence, glass fell into a shop; a woman sprang forward to help her husband who was working there; she was hurt and it was held that she was entitled to damages against the negligent defendants. But Mr. Justice Finlay was faced last week by a recent decision whereby the Court of Appeal checked the tendency to extend the scope of liability. A dairycart had been left unattended, the horse bolted, and a neighbouring householder descended into his garden to see if his children were safe. Meanwhile the horse and cart had come to a standstill in an adjoining field; the man in charge of the cart had arrived on the scene and was shouting for help to hold the horse. The householder, who said he knew very little about horses, climbed over the fence into the field and went to the aid of the dairyman. The horse reared and knocked him down. The Court of Appeal denied his right to damages. Nobody, said Lord Justice Scrutton, has an absolute duty to run out and stop another person's horse; people must be taken to contemplate the probable consequences of their actions; the probable consequence of trying to stop a horse is that one is likely to be hurt. In last week's case Mr. Justice Finlay managed to distinguish the facts from those before the Court of Appeal. For one thing the policeman had a general duty to protect life and property; for another a runaway horse in a crowded street stimulates reactions different from those set up by a restive horse inside a field.

Scientific Evidence of Identity

Sir Francis Fremantle's question to the Home Secretary last week as to the admissibility of blood tests in affiliation cases elicited official recognition that the evidence would be admissible although any provision for compulsory tests would require legislation. As Sir John Gilmour pointed out, the present difficulty is practical rather than legal; there is the question of the cost of the test falling on the man and also the question of his securing the coöperation of the woman. In recent proceedings in the Chatham police-court, noted in these columns not long ago, the legal representative of the woman demanded the blood test, and in cross-examination obtained a consent from the man, but the magistrates decided the case on other grounds.

There was no serious doubt about the admissibility of the evidence if available. A parallel is afforded by expert evidence in criminal cases to determine whether blood is human blood or not. Juries may be unimpressed by a novel application of the results of scientific research, but at any rate the evidence can be offered. The position in criminal proceedings is dominated in English courts by the general principle that the prosecution must prove its case and that the accused has not to prove his innocence. The prosecution has no inherent authority to experiment with the body of the accused in order to establish a case against him. Even the taking of finger-prints or photographs is restricted by prescribed limitations. Once a man has been convicted, his finger impressions and his photograph and measurements may be compulsorily recorded under the Prison Rules, statutory authority being afforded by the Prevention of Crimes Act, 1871, as extended by Section 8 of the Penal Servitude Act, 1891. But an untried prisoner's finger-prints, photograph, or measurements can be taken in prison only on the order of the governor or upon an application in writing made by a police officer of not lower rank than a superintendent if the prisoner objects. The process is not automatic. If the untried prisoner adheres to his objection and force is required, the application must be confirmed by the Secretary of State or by a justice of the peace. If the untried prisoner is discharged or acquitted by the examining magistrates and has not been previously convicted, the photographs and finger impressions must be forthwith destroyed or handed over to him. The value of photography in identification is illustrated afresh by an Indian case recorded in the *Times* of April 18th. In 1925 a villager fired at the legs of two robbers who decamped. Recently a man in custody confessed to several robberies, including that of 1925, and gave the name of his accomplice, who was wounded in the knee. The accomplice was arrested and denied the accusation. There was no external sign of a wound, but X ray photography revealed five small shots in the knee. This evidence, not perhaps conclusive in itself, turned the scale and he was sentenced, nine years after the offence, to seven years' rigorous imprisonment by the Patna court.

KING GEORGE HOSPITAL, ILFORD.—In 1933 there were 3048 in-patients, a substantial increase, and 24,000 out-patients. The beds available are 142, but the average daily number made up was 148. In 1927 there were only 64 beds, by the end of the present year there will be 200. The average stay was 17·9 days. There was a surplus of income over expenditure of £70. The report claims "not only that the King George Hospital made a fuller use of the beds at its disposal than other comparable hospitals, but that the cost per bed was appreciably below the average." The average weekly cost per in-patient was £3 0*s*. 2*d*., and the average total cost £7 13*s*. 11*d*.

PANEL AND CONTRACT PRACTICE

Sickness Benefit and the R.M.O.

LAST week in the House of Commons Mr. J. S. Crooke, M.P. for Deritend, asked the Minister of Health if he was aware that certain approved societies refused health insurance benefits to members, although certified by their panel doctors, unless and until the applicants had been examined by the regional medical officer; and whether, seeing that this action caused unnecessary hardship, he would take steps to revise the rules of approved societies to ensure that payments of benefit were made before the members were sent to the R.M.O. And the Parliamentary Secretary to the Ministry made the following reply:

> Where an approved society desires to obtain a second medical opinion on the subject of a member's incapacity for work, it is entitled to refer the case to a regional medical officer, and it is the general practice of societies in such cases to pay benefit in respect of any period of certified incapacity up to and including the date on which the member is examined by that officer. The payment is made at as early a date as accords with the society's general administrative arrangements, and the Minister does not think it would be reasonable or practicable to impose on societies an obligation to make the payment in all cases before the date of examination.

This defines the position which arises when an insured person claims to be incapable of following his occupation and consequently claims sickness benefit under the Act. The decision to pay or not to pay benefit rests with the approved society. It has to rely on obtainable evidence. If the insured person has kept his stamps up to date, and is not in any other way under the society's rules disentitled to benefit, then probably the most important piece of evidence the society will have to guide it in deciding whether to pay or not is the doctor's certificate. Societies get to know the relative value of these certificates. After the hundreds of thousands of references, after the inquiries into the certification returns, it is fairly well known in approved society circles whether the certificate of Dr. X is or is not likely to be upheld on appeal. If on reference to the R.M.O. most of his cases are found to be capable of work the insured person who claims sickness benefit on his certificate is suspect at once. Before any payment is made to him—and more especially if the sick visitor reports him to be looking well or able to get about—the society will ask the opinion of the regional medical staff. Under these circumstances it would not be "reasonable or practicable" to insist on prepayment of benefit, for it would be impossible to get the money back if the patient was found not to be incapable of work. He can of course appeal.

Some insured persons get the reputation of making claims which are not likely to be justified; they may be so good at it that a doctor who does not know their record may be deceived into granting a certificate of incapacity. Such a case will be sent to the R.M.O. with a report from the society that this patient on previous occasions has been found capable of work. The R.M.O. has the files before him and acts accordingly. The question of financial hardship does arise, although in London the arrangements are so precise that the R.M.O.'s opinion is obtained within four to five days.

Another point has been raised by the organising assistant medical secretary to the London panel committee as a result of his personal contact with insurance practitioners—viz., that many insured persons fail to present themselves for examination because they do not feel equal to the exertion and inconvenience of a journey to Westminster. The Ministry seem to have realised that there is something in this complaint for they have recently modified the arrangements. Whereas there used to be six or more sets of rooms at Dean Friar-street set aside for examination of referred persons there is now only one, and a new centre has been opened at Charles-square, Hoxton, with two sets of rooms, while a little time ago the Stratford-by-Bow centre was increased from two sets to three. There are of course other centres in the outskirts of London—e.g., at Kilburn, Tottenham, Lewisham, Clapham. The advantage of this arrangement is that patients do not have so far to travel and the railway and bus fares to be refunded are reduced in amount. It would be well for insurance practitioners, when sending in a report about a patient who has difficulty in getting about, to indicate to the divisional officer that such-and-such a centre would be convenient if it could be arranged. Another way of smoothing these difficulties is to give the particular day of the week on which a hospital patient usually attends there.

THE SERVICES

NEW CONDITIONS FOR R.A.M.C. OFFICERS

A Royal Warrant published in a special Army Order on April 27th promulgates new conditions under which the commissions in the R.A.M.C. will in future be granted to qualified medical men. The conditions will give effect to the recommendations in the Report of the Fisher Committee on the Medical Branches of the Defence Services issued last year, so far as they affect the Army. The report was fully dealt with at the time of its issue (v. THE LANCET, 1933, ii., 299 and 1059). Hence entry will be by short service commissions for 5 years, at the end of which time officers will be eligible for a gratuity of £1000, unless selected for permanent commissions. Promotion will be to Captain after 1 year and to Major after 10 years' service, instead of after 3½ years and 12 years respectively. The increments of pay which have hitherto been given in these ranks after 8 and 10 years in the case of Captains and after 15, 18 and 20 years in the case of Majors, will in future be given to Captains after 6 and 8 years and to Majors after 13, 16, and 18 years. The establishment of permanent officers will be maintained at a number which it is calculated will ensure promotion to Lieutenant-Colonel and Colonel after approximately 17 and 25 years' service respectively. In the past, the rank of Lieutenant-Colonel has been attained after about 24 years' service, and that of Colonel after about 29 years' service.

It should be noted that ample professional opportunities exist in the course of the duties of officers of the R. A.M.C., for these comprise not only the medical care of the soldiers but of their wives and families, while officers are encouraged to specialise in selected subjects. A selection of candidates for the service, we are informed, will be made about the middle of next June, and full particulars of the conditions can be obtained either by personal application or by letter addressed to the Assistant Director-General

Army Medical Services, the War Office, London, S.W.1.

ROYAL NAVAL MEDICAL SERVICE

Surg. Lt. C. H. Egan to be Surg. Lt.-Comdr.

The following appointments are made: Surg. Comdr. N. A. H. Barlow to *President* for Royal Tournament. Surg. Lt. D. W. Walker to *Drake*.

ROYAL ARMY MEDICAL CORPS

Maj. C. H. H. Harold to be Bt. Lt.-Col.

RESERVE OF OFFICERS

Lt. W. F. de C. Veale, from Wilts R., Supp. Res. of Off., to be Lt.

Dental Corps.—Lt. G. W. C. Bolster, from Gen. List, to be Lt.

TERRITORIAL ARMY

Col. L. D. Bailey, K.H.P., vacates the appt. of A.D.M.S., 47th (2nd Lond.) Div., on completion of tenure, and Col. P. H. Mitchiner, K.H.S., is appointed to the vacancy.

Lt.-Col. F. R. Harris resigns his commn. and retains his rank, with permission to wear the prescribed uniform.

Capt. P. W. MacLagan, having attained the age limit, retires and retains his rank, with permission to wear the precribed uniform.

A. W. Henderson to be Lt.

Supernumerary for service with the O.T.C.—W. M. Nichols (late Cadet Serjt., Glasgow Univ. Contgt., Sen. Div., O.T.C.) to be Lt. for duty with the Med. Unit of the Glasgow Univ. Contgt., Sen Div., O.T.C.

INDIAN MEDICAL SERVICE

Col. D. P. Goil to be Maj.-Gen.

Lt.-Cols. H. C. Buckley and C. H. Reinhold to be Cols.

Maj. N. S. Jatar to be Lt.-Col.

Lts. F. A. B. Sheppard, M. K. Bryce, and J. L. O'Neill to be Capts.

Lt. (on prob.) H. H. Mahmood to be Capt. (on prob.).

Capts. B. Singh and J. M. Gole relinquish their temporary commns.

ROYAL AIR FORCE

V. D'A. Blackburn and J. A. Crockett are granted short service commissions in the rank of Flying Offr. for three years on the active list.

Flight Lts. F. P. Schofield and G. J. Hanly are promoted to the rank of Squadron Leader.

Flying Offrs. H. J. Melville, J. L. Walsh, and A. H. Osmond are promoted to the rank of Flight Lts.

Flight Lt. M. J. Cahalane relinquishes his temporary commission on completion of duty.

Flight Lt. (Honorary Squadron Leader) E. E. Isaac relinquishes his temporary commission on completion of service.

Dental Branch.—W. V. A. Denney is granted a non-permanent commission in the rank of Flying Offr.

Flying Offr. J. E. Willoughby is promoted to the rank of Flight Lt.

CINERADIOGRAPHY

At a special meeting of Fellows of the Royal Society of Medicine held on May 1st, Dr. **Russell J. Reynolds** gave a demonstration of a practical method of X ray cinematography. The President, Mr. V. **Warren Low**, took the chair.

Dr. Russell Reynolds recalled that in 1897 Dr. John MacIntyre, of Glasgow, had shown the moving bones of living animals. His own first experiments had been made in 1921. Methods, he said, must be simple, expeditious, and inexpensive if they were to come into general use. There were two means of taking rapid serial radiograms: the direct and the indirect. The former being very costly, he had directed his attention to the indirect method, in which an ordinary cinematographic camera was used to take photographs of the shadow cast on a fluorescent screen. The three essential conditions were: a sufficiently brilliant image, cutting off the unwanted X rays from the film and ensuring that the subject was not exposed to an excessive dose. Only recently had technical improvements made it possible to obtain satisfactory records of the viscera. Fortunately the lens itself proved to be sufficient protection against direct rays, and it was only necessary to protect the camera with lead. The patient could be protected by synchronising the working of the X ray tube with the movements of the camera shutter. A total exposure of 16 seconds to one area had been given and repeated, and no ill-effects had been noticed. Dr. Reynolds showed lantern slides of the synchronising apparatus and the general lay-out, and gave details of the technique. The method was simple enough, he said, to be worked in any hospital or consulting room, and the apparatus took up very little room. The film was non-inflammable so that no special fire precautions were necessary. The image could be projected normal-sized or enlarged. It was unnecessary in practice to have a long length of film; a short piece could be made up into a band and run continuously through the projector. In this way cases could be studied at leisure. The exposure need only be long enough to obtain a record of the movements desired; in most cases this could be done on a piece of film a foot or more long in a very few seconds. The resulting negative could be printed off again and again on a length of positive film. The expense of production with a 16 mm. film was small.

Dr. Russell Reynolds considered that the method should prove of immense value in investigating lesions of the lungs and pleuræ, especially after lipoidol injections or artificial pneumothorax. There were obvious advantages, too, in being able to study indefinitely movements in pathological states of the alimentary tract. In orthopædic lesions the range of movement in joints could be observed and progress watched. The permanent records could be used in diagnosis, to watch progress or the effect of treatment, to send to other physicians for information or a second opinion, and for teaching purposes. The value of radiology in elucidating anatomy was well recognised; radio-cinematography would do much to reveal the function of organs, notably the heart.

Dr. Russell Reynolds then took a film on the platform, where apparatus was set out for inspection. The film was developed and shown at the conclusion of the meeting. A series of beautiful human films was demonstrated, showing movements in joints, the process of deglutition, the movements of the stomach and intestines, the action of the heart and aorta, respiratory movements of the diaphragm and ribs, and finally the modified, laboured action of some pathological hearts.

Dr. R. **Janker** (Bonn) said that he had cinematographed small objects only by the direct method, at a rate of 22 exposures a second. He showed lantern slides of his apparatus and technique, and then a series of films. The first was the thoraces of a rabbit and a cat showing respiration and heart action in normal breathing and in single and double pneumothorax. The effects of carbon dioxide were shown, and the pulsation of the bronchi demonstrated by filling them with opaque substance. Some interesting pictures showed opaque injection into the femoral vein, its rapid passage to and through the heart, and the formation of emboli in the lungs. Striking films of gastro-intestinal movements in animals followed.

Both sets of films met with high praise from a critical audience who were obviously impressed with the possibilities of the new technique.

OBITUARY

WILLIAM HENRY WELCH, M.D. Columbia Univ., Sc.D. Camb., F.R.C.P. Edin.

LATE DIRECTOR, JOHNS HOPKINS SCHOOL OF HYGIENE AND PUBLIC HEALTH

THE death is announced of Prof. William Welch, the great pathologist, which occurred on April 30th in the Johns Hopkins Hospital, Baltimore, at the age of 84. His fame was literally world-wide.

WILLIAM HENRY WELCH

From a dry-point portrait by Alfred Hutty

William Henry Welch was born at Norfolk, Connecticut, in 1850 of a remarkable medical lineage, for his father, his grandfather, and his great-grandfather were doctors, while he had four medical uncles. A student of the University of Yale he graduated there in Arts in 1870 with high classical honours, but reverted immediately to the family vocation, and in 1871 began his medical curriculum at the College of Physicians and Surgeons, New York. This he added to by scientific work at Yale, and graduated at the College in 1874, when he became interne at the Bellevue Hospital in New York City. This post he held for over a year, and in 1876 started on a series of post-graduate instruction on the continent. His selection of centres and of great leaders was remarkable. At Strassburg von Recklinghausen, at Leipzig Ludwig, and at Breslau Cohnheim assisted in Welch's acquisition of a wide range of knowledge. In Cohnheim's laboratory he witnessed the early experiments of Robert Koch; he went for some months to Vienna, where Chiari and Hebra added to his accumulating store; and before returning to New York in 1878 he made a short stay in London in order to attend Lister's lectures. More remarkable than the young man's ambition and assiduity must seem his power—soon to be proved—of sifting and assimilating such varied and often critical information, retaining both the spirit and the essentials.

On his return to New York it is not surprising that there was competition for his services, and within the next eight years he was offered teaching positions at the College of Physicians and Surgeons of New York (Columbia University), and at the Bellevue. From his first-hand experiences he was able to take, or rather was given, an absolute leadership in settling the share which bacteriological theory and experiment, pathology and pathological anatomy should play both in the routine education of the medical student and in the general development of clinical medicine. A few years later began his long association with the Johns Hopkins University of Baltimore. The story runs that the authorities of the new university inquired from European leaders of medicine for a man qualified to guide the students of Baltimore in modern pathology, when the reply was received that the ideal man for the task was already in their own country and at their doors. As a result Welch was appointed at the age of 34 the first professor of pathology in the university and pathologist to the Johns Hopkins Hospital. His next step was characteristic, for he immediately returned to Europe further to study bacteriology under Koch in Berlin, to work with Pettenkofer in Munich, and with Flügge in Göttingen. He was absent for a year, but the time was well spent, for immediately in the new medical school developments were made in the teaching of pathology under which all the various branches of the subject were correlated with the well-known results. And he worked in a wonderful milieu, for three of the staff of the hospital at the time were William Osler, W. S. Halsted and H. A. Kelly. When the Johns Hopkins medical school was officially opened in 1893 Welch was appointed dean, and gathered round him an institute of experimental medicine of a character unknown in America before—the names of the post-graduate students make medical history. He held the post for five years and discharged its duties while conducting his own investigations, supervising the collection of pathological specimens for a museum, and lecturing in learned and fascinating; way for his teachings were always suggestive of new undertakings, so that those who studied under him caught the zest of his personality. His famous pupils as much as his own work established him as a world influence; and many of them became the leaders in campaigns of all sorts for social and hygienic reform, for Welch was a great judge of character and knew extraordinarily well the qualities of those who served with him.

Welch's career was one of public service. He was president of the Maryland State Board of Health for a quarter of a century, and modern sanitary conditions in Baltimore are the result of his work. In the legislature he was able to promote the enactment of many measures bearing on public health, while he took a prominent part in the formation of the Yellow Fever Commission of the United States Army, upon whose labours followed the comprehension and prevention of yellow fever. During the war, while acting as director of the Johns Hopkins School of Hygiene and Public Health, he discharged medical duties in connexion with the United States Army Reserve, with the final rank of brigadier-general. He resigned his post as director of the School of Hygiene in 1926, but although aged 76, he knew that he had it in him to further promote the cause of medical science. He accepted the position of professor of the history of medicine in the University and—characteristically—immediately came to Europe to study similar institutes and to buy books bearing on the enormous subject. On his return to Baltimore the university founded what is now known as the William H. Welch Medical Library.

Consultation of the Surgeon-General's Catalogue will reveal an extraordinary list of writings under Welch's name. Most were short—almost pamphlets, all were worth while, and many were reissued more than once and bound up as series. His principal contribution to our learning is the treatise on the general bacteriology of surgical infections. It was not, however, as writer, but as original worker and fine exponent of the work of others that he won his fame. And how far-ranging that was is shown by his possession of a long list of honorary doctorates, his nomination to a similarly long series of presidencies of all sorts, including the medical board of the Rockefeller Foundation, and his decorations received from the governments of many foreign countries.

Welch, through frequent visits to Europe, was well known to many English medical men, who will recall his quietly learned conversation, his hospitality, and his courtesy. He could never be mistaken for other than a great man, and he never posed as such.

He was unmarried.

THOMAS RICHARD LLEWELLYN, L.R.C.P. Lond., M.R.C.S.

THE death occurred on April 20th of Dr. Thomas Richard Llewellyn at his house in Penarth. He received his medical education at University College, London, and for a considerable period practised as a colliery medical officer. He was surgeon to Porth Cottage Hospital, Glamorganshire, and acquired an extensive medical practice in the Rhondda Valley, from which he retired to join the Regional Medical Service on its inception in 1920.

We have received from Dr. Llewelyn Williams, medical member of the Welsh Board of Health, the following tribute to Dr. T. R. Llewellyn, whose death constitutes a genuine loss to insurance medical practice in South Wales: "Dr. Llewellyn acted as regional medical officer for East Glamorgan and Monmouthshire. He was a man of strong personality and his high ideals of medical service called for the best from insurance practitioners who practised in his region. He was always frank and straightforward and had a somewhat courtly manner; no one could take liberties with Dr. Llewellyn, but those who tried to do their best found in him a good friend. His wide clinical experience in a large colliery practice before and after the passing of the National Insurance Act enabled him to perform his duties as medical referee with great satisfaction to approved societies and insurance medical practitioners. Much of the improvement in the clinical aspect of insurance practice is due to his efforts. The Welsh Board of Health have lost a loyal and efficient officer and his medical colleagues a true and faithful friend."

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

Lotteries and Hospital Finance

IN the House of Lords on April 26th, the Marquess of LONDONDERRY, in moving the second reading of the Betting and Lotteries Bill, said the Government had not approached this question from the moral point of view. Private morals were a matter for the individual conscience and the improvement of individual behaviour must be left to the influences of religion and education. Their sole concern had been with the social effects of gambling, and they had based their proposals solely on a consideration of the evil social consequences which excessive and continuous gambling had been shown by experience to entail. Under the existing law all lotteries were unlawful, unless expressly authorised by Act of Parliament.

The law made no differentiation between large and small lotteries, or between public and private lotteries; and it was immaterial whether a lottery be for charity or for private gain. If the law were strictly enforced effective steps could be taken to suppress at any rate those lotteries which were promoted in this country. But the law had long been recognised to be too drastic in its provisions so far as concerned certain innocuous forms of lottery; and an administrative practice had grown up in England and Wales, and had been in force for many years, under which the police did not set the criminal law in motion against private lotteries confined to members of a genuine club or society or against such small public lotteries as raffles at bazaars and the like. As the Royal Commission pointed out, a new situation had arisen from the sale in this country of tickets in lotteries promoted abroad, notably the Irish Hospitals Trust sweepstakes. Ever since the introduction of the Irish sweepstakes there had been an agitation in this country for the legalisation of large lotteries for charitable and other objects, but, so far, Parliament had definitely set its face against any relaxation of the existing law, and had maintained the prohibition of all forms of lotteries, whether promoted for charitable or other objects. In 1918, long before the Irish sweepstakes, a second reading was refused in the House of Commons to a Bill (the Lotteries (War Charities) Bill, 1918), which had passed through their Lordships' House, and the object of which was to allow the governing body of a registered war charity, with the consent of the police, to raise money by lotteries.

The question of lotteries, said Lord LONDONDERRY, came up for discussion again in May, 1931, when leave to bring in a Bill to authorise the raising of money by means of lotteries for the support of hospitals was refused in the House of Commons. In 1932 a Bill making it lawful for the governing body or trustees of any charity, within the meaning of the Charitable Trusts Acts, to hold a lottery, with the approval of the Secretary of State, to raise money for charitable, philanthropic, scientific, or artistic purposes, or for carrying out any public improvement or other public object, obtained a first reading in the House of Commons, but made no further progress. The Royal Commission, in their final report, reached the conclusion that a relaxation of the existing prohibition of large lotteries was undesirable and not called for. The Government, having also given independent consideration to the question and having studied the views expressed in the House of Lords on Nov. 30th last (see THE LANCET, 1933, ii., 1346), were in agreement that large scale lotteries, whether promoted by the State, for the direct benefit of the Exchequer, or by a statutory Board, for charitable objects, or by individual charities under a system of permits, were socially undesirable.

As regarded lotteries for charitable purposes, it might be questioned, as the Royal Commission pointed out, whether in the long run voluntary hospitals in this country would benefit by participation in the proceeds of lotteries, and speaking for himself, as president of two hospitals, he was quite convinced that the adoption of the system of public lotteries for the support of our hospitals would be disastrous.

The total receipts of 1014 British hospitals for the year 1930 was over £15,500,000. It was clear that, unless the total subscriptions to lotteries amounted to a very large figure, the proceeds would not be a very material factor in hospital finance. But, quite apart from the purely financial consideration, he was of the opinion that it would be calamitous to this country if, by encouraging hospitals to derive their finances from the proceeds of lotteries, hospitals were to lose that element of personal service and personal interest which the present voluntary system achieved.

If the promotion of large lotteries in this country was to be prohibited, the prohibition of the sale of foreign lottery tickets was a necessary corollary.

The law against lotteries was over 100 years old. In form it was largely archaic, and experience had shown that one of its greatest defects was that it did nothing to stop one essential factor in the success of the Irish sweepstakes—namely, press publicity. Clause 19 of the Bill maintained and re-enacted the general prohibition of lotteries other than certain small schemes. It would continue to be an offence to print, publish, or sell, or distribute, or advertise for sale any tickets or chances in a lottery. The Bill prohibited absolutely the publication of matter descriptive of the drawing, or intended drawing, of any lottery, or any list (whether complete or not) of prize-winners or winning tickets in the lottery. It prohibited the publication of any other matter relating to any lottery which was calculated to act as an inducement to persons to participate in that lottery or in other lotteries. It made it an offence to bring into, or to invite any person to send into, this country any tickets or advertisements of a lottery for the purpose of sale or distribution. It prohibited the sending abroad, by agents in this country, of counterfoils or money derived from the sale in this country of foreign lottery tickets.

The Bill did not seek to make it an offence for an individual to purchase a ticket in a lottery. That was in accordance with the general principle, which they had adopted, that the law was aimed at the exploitation of the gambling propensity of the public, and did not seek to punish the individual citizen who made use of facilities for gambling provided by others.

Water-supplies Bill

In the House of Commons on April 30th the Water Supplies (Exceptional Shortage Orders) Bill was read a third time. Sir Hilton Young, in moving the third reading, said that although there had been a welcome change, it had not been so substantial as to make the measure unnecessary. There had not been more than normal rains, and abnormal rains would be necessary to relieve the Government from the necessity for the emergency measures. He had received returns from nine of the places where the difficulties were greatest, and in only one place had there been such a large increase as to put a new face on the situation. The Government still looked to the country as a whole for its coöperation in protecting itself against the evil consequences of the drought.

Health and Welfare in Shops

On April 30th the Shops Bill, which had already passed through the House of Lords, was read a second time and committed to a standing committee.

Plymouth Hospital Bill

In the House of Lords on May 1st, the South Devon and East Cornwall Hospital, Plymouth, Royal Albert Hospital, Devonport, and Central Hospital, Plymouth (Amalgamation, etc.) Bill was read the third time, and passed.

HOUSE OF COMMONS

WEDNESDAY, APRIL 25TH

Sulphur Fumes from Battersea Power Station

Mr. Alan Todd asked the Minister of Transport whether he was satisfied that the pledge given by the Government on Sept. 26th, 1929, to the representatives of the Chelsea borough council with reference to the emission of sulphur fumes from the Battersea power station had been fulfilled; and if he would make a statement as to the question of emission of smoke and fumes from the power station.—Mr. Oliver Stanley replied: The pledge referred to still holds, and the remaining sections of the new Battersea power station will not be sanctioned unless the gas washing plant already installed is working efficiently. The position at present is that while there is no reason to be dissatisfied with the results so far obtained, the station has not yet been in commercial operation sufficiently long for a final conclusion to be reached.

Medical Treatment of Unemployed Persons

Mr. John asked the Minister of Health whether it was intended that persons in receipt of transitional benefit and who had lost their medical benefit under the National Health Insurance Act should be entitled to medical treatment from the public assistance authorities.—Mr. Shakespeare, Parliamentary Secretary to the Ministry of Health, replied: All persons who are insured under the National Health Insurance Acts are entitled to medical benefit under those Acts. Persons who have ceased to be insured, whether in receipt of transitional payment or not, and who are in need of medical treatment and are not in a position to meet the cost of such treatment, are entitled to have recourse to the public assistance authorities.

THURSDAY, APRIL 26TH

Boys and Corporal Punishment

Mr. Bernays asked the Home Secretary how many boys under 14 were sentenced to corporal punishment in 1933; and whether he was satisfied with the response by magistrates to the official discouragement of the Home Office of the frequent employment of this form of punishment.—Sir John Gilmour replied: Statistics for 1933 are not yet available. A circular letter about the Children and Young Persons Act of 1933 was sent by the Home Office to courts of summary jurisdiction in August last, and in this circular it was pointed out that while in the new Act the power to order a child to be whipped is retained, the practice of the most experienced juvenile courts for many years shows that these courts rarely or never need to exercise this power. The question when use shall be made of any form of penalty authorised by law must be one for the discretion of the justices.

Milk-supplies to Public Institutions

Lieut.-Colonel Heneage asked the Home Secretary whether the contracts of the institutions under his control required the purchase of certified, Grade A, or ordinary standard milk.—Sir John Gilmour replied: As regards schools approved under the Children and Young Persons Act, 1933, some provide themselves with milk from their own farms; the others purchase ordinary standard milk. As regards prisons and borstal institutions, milk contracts require the supply of fresh genuine whole milk, the conditions being substantially the same as those laid down by the Milk Marketing Board. Certified and Grade A milk is not used.

Injuries and Sickness Caused by Police Sports

Mr. Lunn asked the Home Secretary the number of men at present on the sick list as a consequence of injuries received or sickness resulting from participation in police sports.—Sir J. Gilmour replied: At the present time 32 members of the metropolitan police force are on the sick list for the reason stated—one sergeant and 31 constables.

Equalisation of Rents of Council Houses

Mr. Joel asked the Minister of Health the number of councils which, at the present time, were considering schemes for the equalisation of rents under which it was proposed to pool the subsidies and to see that the poorest people get the full benefit and the tenants who could afford it paid economic rents.—Sir Hilton Young replied: Local authorities are not required to report action of this kind, or their consideration of its possibility to me, but under the existing law a general pooling of the subsidies given under two or more separate Acts is not permissible.

Miss Rathbone: Is the right hon. gentleman aware that a considerable number of these local authorities are pooling a part of the subsidy for the relief of poor tenants, and that the Leeds corporation is the only municipality which is pooling the whole of the subsidy and requiring tenants who can afford it to pay the full economic rents as recommended by his own circular?

Sir Hilton Young: I am certainly aware that the development in Leeds goes very much further than anywhere else.

Mr. Mabane: Is it not a fact that in Leeds hundreds of corporation houses are being vacated and are empty?

Sir Hilton Young: I am aware that the experiment being conducted in Leeds is not wholly without friction.

Major Milner: Is the right hon. gentleman aware that in point of fact it is a great success, and that there is a surplus on the rent pool of some thousands of pounds?

No further answer was given.

Scales of Relief for Children

Mr. Hutchison asked the Minister of Health which public assistance authorities had taken steps to raise their scales of relief for children to 3*s*. per head since February of this year.—Sir Hilton Young replied: I am aware that this increase has been made, in the period suggested, by the county borough councils of Bolton, Rochdale, and Salford. I should, however, explain that there is no obligation on public assistance authorities to frame a scale of relief or to report any scale so framed to me, and that there has never been any rule that the relief granted to the head of a family in respect of a child should be fixed at any particular figure.

TUESDAY, MAY 1ST

Medical Branches of Defence Services

Captain ELLISTON asked the Secretary to the Treasury whether he could now announce the decisions of the Government as to the recommendations of the Warren Fisher Report on the medical branches of the defence services.—Mr. HORE-BELISHA replied: The Government have adopted the recommendations of the committee in their application to the medical branches of the Army and Royal Air Force. As regards the Royal Navy it has been considered necessary to modify the scheme recommended in certain particulars. The changes will take effect from to-day, and details will be found in the various orders which are on the point of publication.

MEDICAL NEWS

General Medical Council: Election of Direct Representative

The result of the voting in the recent election of a direct representative for England, in the place of the late Dr. Christine Mary Murrell, was as follows:—

HARRY GUY DAIN, M.B., M.R.C.S.	11,091
EDWARD ANDREW GREGG, L.R.C.P. & S.I.	3,194

Dr. Dain has accordingly been elected a member of the General Council of Medical Education and Registration of the United Kingdom, representing the registered medical practitioners resident in England, for a period of five years from April 27th, 1934.

University of Oxford

On April 26th the degree of doctor of medicine was conferred on F. J. Sale.

University of Cambridge

On April 28th the following degrees were conferred:—

M.D.—F. A. Richards and Hermon Taylor.

M.B. and B.Chir.—Alan Bowen-Davies.

M.B.—R. H. Fish and E. W. Taylor.

B.Chir.—P. R. Goodfellow, H. J. M. Robinson, and W. F. Nicholson.

Royal College of Physicians of London

At a comitia of the college held on April 26th, with Lord Dawson, the president, in the chair, the following members were elected to the fellowship:—

Thomas Gillman Moorhead, M.D. Dub., President of the Royal College of Physicians of Ireland; Duncan Graham, M.D. Toronto (Toronto); Patrick Playfair Laidlaw, F.R.S., B.Ch. Camb. (London); Geoffrey Eden, M.D. Camb. (Birmingham); Helen Marion Macpherson Mackay, M.D. Lond. (London); Walter Rupert Reynell, D.M. Oxon. (London); Richard Christopher Clarke, M.B. Brist. (Bristol); James Riddell Bell, M.D. Melb. (Melbourne); Thos. Sidney Nelson, M.B. Oxon. (London); William Stobie, M.D. Edin. (Oxford); Thomas Arthur Hughes, M.D. Dub. (Lahore); Claude Blaxland Levick, M.B. Sydney (London); Peter Knight McCowan, M.D. Edin. (Cardiff); Maurice Elgie Shaw, D.M. Oxon. (London); Sidney Campbell Dyke, D.M. Oxon. (Wolverhampton); William Moodie, M.D. St. And. (London); William Ernest Lloyd, M.D. Lond. (London); Victor John Frederick Lack, M.D. Lond. (London); Bernard Edward Schlesinger, M.D. Camb. (London); Alan Aird Moncrieff, M.D. Lond. (London); William Edmund Cooke, M.D. Liverp. (Wigan); Edward Revill Cullinan, M.D. Lond. (London); Kenneth Edwin Harris, M.D. Camb. (London); Henry Cohen, M.D. Liverp. (Liverpool); William Robert Fitzgerald Collis, M.D. Camb. (Dublin); William Norwood East, M.D. Lond. (London); Robert Dick Gillespie, M.D. Glasg. (London); Warrington Yorke, M.D. Liverp. (Liverpool); Fergus Robert Ferguson, M.D. Manch. (Manchester); Sir Pendrill Charles Varrier-Jones (Papworth); and John St. Clair Elkington, M.B. Camb. (London).

The following were admitted members of the College:—

Stanley George Browne, M.B. Lond.; William Allen Daley, M.D. Lond.; Ramanlal Ambelal Desai, M.B. Bombay; Kenneth James Franklin, D.M. Oxon.; John Bishop Harman, L.R.C.P.; Arthur Landau, M.B. Cape Town; Charles Roger Tyssen Lane, M.B. Camb.; Gordon Alan Macdona Lintott, M.B. Lond.; Leonard Joseph Alphonse Loewenthal, M.B. Liverp.; Harold Edward MacMahon, M.D.; Naguib Bey Mahfouz; Arthur John Rushton O'Brien, M.B. Edin.; Matthew Burrow Ray, D.S.O., M.D. Edin.; Eric Camillo Ritter, M.B. Glasg.; Cuthbert Harry Rogerson, M.D. Lond.; Martin Richard Thomas, M.B. Lond.; Harold Williamson, M.D. Durh.; Alexander Louis Wingfield, M.B. Lond.; and Barbara Edith Woodhead, M.B. Birm.

Licences were conferred upon 166 candidates (146 men and 20 women) who have passed the final examination of the Conjoint Board, and have complied with the by-laws of the College. The following are the names and medical schools of the successful candidates:—

A. K. Acharya, Calcutta and West Lond.; A. R. Agati, St. Thos.; Helen M. B. Alcock, King's Coll.; E. C. Allibone, Leeds; J. E. O. Amegatcher, Camb. and St. Thos.; J. B. Andosca, Boston and King's Coll.; R. A. Andrews, Camb. and Guy's; M. Appelman, St. Bart.'s; R. C. B. Barbor, Camb. and St. Thos.; A. H. Bartley, Bombay and West Lond.; C. H. D. Bartley, Camb and St. Thos.; H. H. Bayley, Camb. and King's Coll.; R. A. Binning, Camb. and St. George's; L. C. Bousfield, Middx.; J. Boyle, St. Mary's; Joyce M. Brockington and Edith J. R. Browne, Royal Free; J. C. H. Browne, Middx.; A. G. Butters, St. Bart.'s; N. A. Buxton, Camb. and Middx.; E. M. Buzzard, Oxon and St. Thos.; H. Cameron, Guy's; Ruth M. Campbell, Bengal and Royal Free; A. M. R. Cann, Middx.; H. Caplin, London; C. M. Carlyle-Gall, St. Thos.; R. Carpenter, St. Bart.'s; R. M. Clarke, Middx.; C. D. Clements, Univ. Coll.; C. J. Cobbe, St. Thos.; A. N. F. Critchley, St. George's; J. H. J. Crosse and T. M. Daniel, Camb. and St. Bart.'s; H. H. Davies, St. Bart.'s; D. W. A. De Gazon, Univ. Coll.; Audrey P. Dence, Royal Free; Rosalind M. S. Derham, Bristol; A. E. De Sa, Bombay and Middx.; A. M. Desmond, London; J. A. Dhacka, Bombay and Univ. Coll.; Lynette Dowsett, Royal Free; F. W. Dunn, Charing Cross; C. E. Elliott, Camb. and St. George's; H. J. Fenn, King's Coll.; A. B. R. Finn, Camb. and St. Thos.; J. M. Fleming, London; P. A. Flood, Camb. and St. Thos.; J. F. A. Forster, Guy's; J. A. C. Franklin, St. Thos.; Violet Fry, Bristol; L. B. Furber, St. Bart.'s; W. R. Gavin, Camb. and St. Thos.; S. W. Gillman, Univ. Coll.; Bessie W. Goodwill, Birmingham; H. W. Gordon, Witwatersrand and London; R. I. N. Greaves, Camb. and St. Mary's; J. Greenhalgh, Guy's; T. F. Greenwood, Middx.; G. D. Hadley, Camb. and Middx.; G. J. Hamilton, St. Bart.'s; W. H. Hamilton, Guy's; J. W. Hannay, Camb. and London; J. Hardman, Birmingham; J. H. T. Harrington, Oxon. and St. Mary's; L. D. Harris, Cornell and St. Mary's; T. N. Hart, Camb. and Manchester; Violet C. Hart, Royal Free and West London; A. E. M. Hartley, Camb. and St. Mary's; L. A. Hawkins, Camb. and London; Barbara D. F. Hay-Cooper, Royal Free; J. N. Heales, Bristol; D. F. Heath, Birmingham and Durham; R. R. Henderson, St. Thos.; T. S. Heslop, Manchester; R. Hill, St. Mary's; I. W. Hockley, St. Thos.; N. T. Holden, Camb. and Westminster; R. D. Holloway, Camb. and St. George's; M. H. Hosny, Birmingham; A. G. Hounslow, Univ. Coll.; D. A. Hovenden, St. Thos.; H. G. Howitt and G. B. Hughes, London; N. G. Hulbert, Camb. and St. Bart.'s; J. A. C. Hunter, Guy's; D. B. Hyslop, Charing Cross; R. S. Illingworth, Leeds; A. Innes, Camb. and St. Bart.'s; J. E. Jameson, St. Thos.; C. C. Jeffery, London; B. S. Jones, Camb. and London; I. D. Jones, Middx.; A. C. Kanaar, St. Bart.'s; H. R. Kasday, New York and Middx.; L. M. Kelly, St. Thos.; R. L. Kerr, Camb. and St. Mary's; M. A. Khan, Osmania and West London; J. Kingston, London; J. W. J. Knowles, St. Thos.; Hilda I. Lanceley, King's Coll.; K. A. Latter, St. Bart.'s; A. M. Lester, King's Coll.; T. Levitt, Cape and Middx.; Margaret M. C. Louden, Royal Free; D. Lubin, Ohio and Belfast; K. Lumsden, Camb. and St. Bart.'s; W. D. F. Lytle, St. Thos.; W. M. Macleod, St. Thos.; I. Magdi, Cairo and St. Bart.'s; T. F. Malcolm, Manitoba; K. W. Martin, Camb. and St. Bart.'s; L. C. Martin, Camb. and Middx.; J. D. Martin-Jones, Camb. and St. Bart.'s; S. P. Mason, Middx.; H. B. May, Camb. and London; Queenie I. E. May, Royal Free; N. H. Merchant, Bombay and Univ. Coll.; Lida O. Meredith, West London and Royal Free; W. G. Q. Mills, Camb. and St. Thos.; R. H. Moodie, Bristol; J. N. Morris, Univ. Coll.; L. O. Mountford, Camb. and London; D. J. M. Moynahan, St. Bart.'s; J. H. Neal, Middx.; G. P. Neogy, Bengal and London; A. Orlek, Witwatersrand and St. Bart.'s; N. C. Oswald, Camb. and Charing Cross; B. H. Page, Camb. and London; C. G. Parsons, Camb. and Birmingham; J. E. G. Pearson, Oxon. and Middx.; D. S. Piper, Guy's; G. T. Pitts, Camb. and St. Thos.; C. H. G. Price, Bristol; R. E. A. Price, London; Silvia W. Pyddoke, Royal Free; S. Rameshwer, Lucknow and Middx.; T. A. [illegible], Camb. and St. Thos.; K. B. Rogers, St. Mary's; [illegible]; K. G. Seager, St. Mary's; B. Selwyn, Univ. Coll.; J. G. Sheldon, Liverpool; T. L. H. Shore, Camb. and London; H. S. Shucksmith, Leeds; M. Shun-Shin, Univ. Coll.; G. E. T. Soden and H. G. Stanton, St. Bart.'s; W. J. Stokes, London; G. L. R. Tapsall, Madras and St. Mary's; W. P. M. Telfer, St. Bart.'s; Elisabeth J. M. Thomas, Univ. Coll.; A. S. Till, Camb. and Middx.; G. C. Tooth, Camb. and St. Bart.'s; Elsie E. Vincent, Royal Free; J. H. Walters, Camb. and King's Coll.; W. F. Walton, Camb. and St. Thos.; C. R. H. Weekes, Camb. and St. Bart.'s; C. W. Warne, Guy's; Elizabeth B. White, Royal Free; P. A. Wilkinson, Guy's; M. Williams, Camb. and St. George's; J. W. Wishart, Manchester; A. R. Wood, Royal Free and Camb.; O. H. M. Woodbridge, Guy's; and A. R. C. Young, St. Bart.'s.

Diplomas in tropical medicine and hygiene were conferred jointly with the Royal College of Surgeons upon the candidates whose names were given in THE LANCET of April 21st (p. 874).

The diploma in gynæcology and obstetrics was conferred jointly with the Royal College of Surgeons upon K. S. Jayakar, Bombay.

Lord Dawson was re-elected representative of the

College on the governing body of the British Postgraduate Hospital and Medical School.

Dr. C. H. Andrewes is delivering the Oliver-Sharpey lectures on May 1st and 3rd on viruses in relation to the ætiology of tumours, and Prof. O. L. V. S. de Wesselow the Croonian lectures on June 5th, 7th, and 12th on arterial hypertension.

Charles Murchison Scholarships in Clinical Medicine.—An examination for this scholarship will be held at the College from June 19th onwards and is open to students of medicine studying in London or Edinburgh. Further particulars will be found in our advertisement columns.

Scottish Conjoint Board

As a result of recent examinations of the conjoint examining board of the Royal College of Physicians and Surgeons of Edinburgh and the Royal Faculty of Physicians and Surgeons of Glasgow, the following candidates have been granted the diplomas of L.R.C.P. Edin., L.R.C.S. Edin., L.R.F.P. & S. Glasg. :—

J. B. Coltman, A. B. Daoud, M. W. M. de Silva, P. J. Duff, M. H. Flinter, T. D. Fraser, T. K. Ghosh, Leonard Grech, Sylvia S. Gunn, M. A. Hayford, J. S. Hunter, I. M. Ali Ismail, W. A. Kennedy, T. A. Kester, Arthur Lucas, Adolph Meyer, P. F. Meyer, M. A. Nasr, M. G. Odendaal, M. K. K. Pillai, A. W. Pollock, Michael Siger, J. K. Swanston, I. I. Thomas, J. F. Trigg, E. B. Weeks, and D. S. Williams.

University of London

The senate are inviting applications for the Laura de Saliceto studentship for the advancement of cancer research, which is of the value of £150 a year. Applications should be sent to the academic registrar of the University, South Kensington, S.W.7, before July 1st.

University of London Medical Graduates Society

The annual meeting and dinner of this society will be held at the Langham Hotel, W., on Tuesday, May 8th, at 7 for 7.30 P.M. Applications for tickets should be sent to the hon. secretaries, 11, Chandos-street, Cavendish-square, W.1, not later than to-day, Saturday, May 5th.

Cambridge Graduates' Medical Club

The annual dinner of the Cambridge Graduates' Medical Club will be held at the Langham Hotel, W., on Wednesday, May 9th, at 7.15 for 7.45 P.M., with the president, Dr. H. Morley Fletcher, in the chair. The honorary secretaries are Dr. F. G. Chandler and Mr. W. D. Doherty, and applications for tickets may be addressed to 10, Upper Wimpole-street, London, W.1.

Glasgow University Club, London

This club will dine at the Trocadero Restaurant, Piccadilly-circus, W., on Friday, May 25th, at 7.15 for 7.30 P.M. Sir Robert Muir, F.R.S., will be in the chair. The honorary secretary may be addressed at 62, Harley-house, N.W. 1.

Aberdeen University Club, London

The ninety-first half-yearly dinner of this club will be held at the Trocadero Restaurant, Piccadilly-circus, W., at 7 for 7.30 P.M., on Thursday, May 17th, with Prof. Alexander Low in the chair. The secretary may be addressed at 16, Tregunter-road, S.W.10.

British College of Obstetricians and Gynæcologists

The quarterly meeting of the council was held on April 27th in the College House, with Dr. J. S. Fairbairn, the president, in the chair. Agnes Marshall Cowan (Manchuria) and Charles Leopold Granville Chapman (Grimsby) were elected to the membership of the College.

The president formally admitted to the fellowship :—

Duncan Coutts, India ; Peter Fleming Gow, India ; Gordon Grant, Johannesburg ; Sydney Nuttall Hayes, India ; Maurice Lawrence Treston, India ; and James Hayward Willett, Liverpool.

and to the membership :—

Margaret Emily Anderson, Gavin Stiell Brown, John Lloyd Davies, Charlotte Ann Douglas, Gwyneth Griffith, Kathleen Marguerite Douglas Harding, Jocelyn Adelaide Medway Moore, Percy Peltz, John Marshall Scott, and Arthur Joseph Wrigley.

A silver mace was presented to the College by the Gynæcological Club.

Royal College of Surgeons of England

The council invites applications for election to the office of Hunterian professor, Arris and Gale lecturer, and Erasmus Wilson lecturer for the coming year. Particulars will be found in our advertisement columns.

London Jewish Hospital Medical Society

Dr. Charles Singer, professor of the history of medicine in the University of London, will deliver the annual oration of this society on Thursday, May 10th, at 4 P.M., at the London Jewish Hospital, Stepney Green, E. The subject of the lecture will be the contrast between ancient and modern science.

Will Edmonds Clinical Research Fund

A Fellow is to be elected in June who will receive a salary of £500 under this fund. He must devote the whole of his time to clinical research in a metropolitan hospital, and will be eligible for re-election annually up to a term of five years. Applications should be sent, in proper form, to the honorary secretary of the fund, 68, Great Cumberland-place, London, W.1, not later than June 1st.

Cremation Conference

The Federation of Cremation Authorities and the National Association of Cemetery and Crematorium Superintendents are holding the third annual joint conference at Birmingham from June 25th to 28th. Sir Gilbert Barling is among those who will read papers.

Shenley Mental Hospital

The Middlesex county council announce that the King, who will be accompanied by the Queen, has consented to open this new hospital, near Radlett, Hertfordshire, on Thursday, May 31st.

Norfolk and Norwich Hospital

Last year this hospital treated 6422 in-patients, the largest number on record ; the income of £54,232 also exceeded all previous figures, and left a credit balance of £2947.

East Suffolk and Ipswich Hospital

Last year the contributory scheme of this hospital produced £31,230, which was 59 per cent. of its total income. Every firm in Ipswich is a member.

Liverpool Medical Institution

The fifth Hugh Owen Thomas memorial lecture will be given in the institution on Thursday, May 10th, at 4.30 P.M., by Mr. John Fraser, regius professor of clinical surgery in the University of Edinburgh. Prof. Fraser will speak on lipoid granulomatosis of bone.

A Five-day Week

During the present summer a five-day week will be worked in the Nottingham factories of Boots Pure Drug Company, which employ 5000 people. The premises will be closed from Friday evening until Monday morning, and there will be no reduction of pay. The scheme is at present experimental, but if the results, on review in September, are found to be satisfactory, it may later become permanent—at any rate in the summer months. Lord Trent, the chairman of directors, announces that his firm hope next year to arrange some form of extra holidays, with pay, for their retail employees.

Medical Research Fellowships

The Rockefeller medical fellowships for 1934–35 will shortly be awarded by the Medical Research Council. The value of these fellowships will be not less than £350, exclusive of allowances, and they are given in accordance with the wishes of the Rockefeller Foundation, to graduates who have had some training in research work in the primary sciences of medicine, or in clinical medicine or surgery, and are likely to profit by a period of work at a university or other chosen centre in the United States before taking up positions for higher teaching or research in the British Isles. In special circumstances the fellowships may be tenable at centres of research not in America. Further particulars are obtainable from the secretary of the Council, 38 Old Queen-street, Westminster, London, S.W.1. Applications must be made by June 1st.

Navy Medical Compassionate Fund

At the quarterly meeting of the directors of this fund, held on April 19th, with Surgeon Vice-Admiral Sir Reginald Bond, medical director-general of the navy, in the chair, the sum of £235 was distributed.

University College, London

The fellows of University College held their annual dinner at the college last Monday with Sir John Rose Bradford, M.D., F.R.S., chairman of the college committee, in the chair. Before dinner, those who had been recently elected were admitted to the honorary fellowship or fellowship by the chairman. Emeritus Professor Karl Pearson, F.R.S., is among the new honorary fellows and Mr. Alan Sterling Parkes, D.Sc., F.R.S., among the new fellows.

The Ministry of Health

Mr. E. J. Maude, C.B., has been appointed deputy secretary to the Ministry of Health in succession to Sir Arthur Lowry, C.B., deputy secretary and chief general inspector, who has retired after 42 years of service in the Local Government Board and the Ministry of Health. Mr. T. D. Harrison succeeds Mr. Maude as solicitor and legal adviser to the Ministry, and Mr. H. A. Leggett, C.B., director of establishments, will act as chief general inspector also.

Conference of Voluntary Hospitals

On Wednesday June 13th, the Prince of Wales will open a Conference of Voluntary Hospitals of Great Britain and Ireland, at the Guildhall, London, E.C.2. The speakers at the conference will include Sir Robert Bolam, Mr. E. Rock Carling, Lord Horder, Dr. René Sand and Sir George Newman, and it will end, with the annual meeting of the British Hospitals Association, on Saturday, June 16th. The Duke of York is to preside over the conference dinner at the Guildhall on the 14th. Particulars may be had from the organising secretary at 12, Grosvenor Crescent, London, S.W.1.

National Hospital, Queen-square

The annual report of this hospital for nervous diseases states that no material progress has been made with the extension and rebuilding scheme, but the reconstruction of the surgical department is being strongly urged by the medical committee which points out that if the hospital "is to maintain its reputation" its recommendations "should be put into effect without delay." Last year there were 1459 in-patients whose average stay was 44 days and average weekly cost £3 9*s.* 6*d.* Expenditure exceeded income by £3817, and brought the deficits of six successive years to £27,000.

Worthing Hospital

Sir E. Cooper Perry has succeeded the late Mr. Robert W. Charles as chairman of the governors, and at the annual meeting on March 29th he announced that it had been decided to proceed to a new maternity block which would increase the number of beds from 67 to 78. The deficit on the year's working amounted to £1125. The governors were of the opinion that the Sussex Provident Scheme and the household box scheme were two sources of income most likely to increase. At present each brought to the hospital over £500 a year. The special appeal during 1933 for £4000 for the maternity and pay-patients' wards had raised £3783.

National Health Insurance in South Africa

In the Union House of Assembly at Capetown on March 27th, in reply to a question by Dr. E. P. Baumann whether the Government had taken into consideration the advisability of establishing a State Medical Service in the Union, the Minister of Public Health, Mr. J. H. Hofmeyr, said: "If, as is assumed, the hon. member means by a State medical service a contributory scheme of health insurance such as that in force in Great Britain or Germany, it is not considered practicable at present to establish such a service." The Minister added that he hoped shortly, in connection with the Budget, to give the House full information in regard to provision for the needs of the large section of the population unable, under existing conditions, to secure medical attention.

Donations and Bequests

Dr. Edward John Cave, of Bath, who died on Feb. 16th left estate of the value of £49,679, with net personalty £47,547. He left £6000 to St. Bartholomew's Hospital, for an entrance scholarship to be known as the Helen Cave memorial scholarship.—The late Mr. Joseph Bourne Bradley, of Dudley, Worcs, among other bequests, left £400 to the Dudley District and Bradley District Nursing Home; £400 to the Guest Hospital, Dudley; and £400 to the Royal Orthopædic and Spinal Hospital, Birmingham.—Under the will of the late Mr. Thomas Keaveney, J.P., of Belfast, the Mater Infirmorum Hospital, Belfast, will receive £1000 for a "Keaveney Bed."—The late Sir Alexander Lyle, among other bequests, left £1500 or such larger sum as may be required for the endowment of a bed in the Perth Royal Infirmary, to be called "The Lyle Bed" and £1000 to Greenock Hospital and Infirmary.

Medical Diary

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

TUESDAY, May 8th.

Therapeutics and Pharmacology. 3.30 P.M. Annual General Meeting (at the Pharmaceutical Laboratory, University College). Demonstrations: Sir William Bragg and Mr. R. Paul: 1. Apparatus for Prolonged Artificial Respiration. Katharine H. Coward: 2. Estimation of Antineuritic Vitamin. F. J. Dyer: 3. Estimation of Parathyroid Hormone. J. C. Gage: 4. Standardised Preparation of Digitalin. H. Barcroft: 5. Increase of Systemic Flow Following Occlusion of the Thoracic Aorta. S. L. Cowan: 6. The Rein Thermo-stromuhr. W. Feldberg and O. Krayer: Liberation of Acetylcholine by Dog's Heart during Stimulation of the Vagus. G. W. Theobald: The Influence of Changes in Intra-ureteric Pressure on Water Diuresis. 5 P.M. *Communications:* G. W. Theobald: An Antidiuretic Substance in the Ultra-filtrate of Blood from Eclamptic Patients. H. R. Ing: The Pharmacological Action of Quaternary Ammonium Salts. B. Szabuniewicz: The Alleged Occurrence of Water Diuresis as a Conditioned Phenomenon. G. W. Theobald and E. B. Verney: Water Diuresis and its Inhibition after Complete Denervation of the Kidney.

Psychiatry. 8.30 P.M. Annual General Meeting. Dr. A. Adler. Paper: Aspects of Delinquency.

WEDNESDAY.

Surgery: Subsection of Proctology. 5 P.M. Annual General Meeting. Surgical Treatment of Carcinoma of the Colon; Discussion, to be opened by Dr. Fred W. Ranken (Lexington, Kentucky) and Dr. T. de Martel (Paris), followed by Sir Charles Gordon-Watson and Mr. J. P. Lockhart-Mummery.

FRIDAY.

Clinical. 4 P.M. Cases of Affections of the Gall-bladder: Mr. Mortimer Woolf, Dr. Dorothy Hare, Mr. Cecil Joll, Dr. Charles Newman, and Dr. J. E. A. Lynham. 4.45 P.M. Annual General Meeting. Short Papers on Gall-bladder: Prof. H. H. Woollard, Dr. C. E. Newman, Dr. H. K. Graham Hodgson, and Mr. A. J. Walton.

Obstetrics and Gynæcology. 8.15 P.M. Annual General Meeting. Discussion on Genital Prolapse, to be opened by Mr. Victor Bonney, Prof. Fletcher Shaw, Prof. A. Leyland Robinson, and Dr. C. A. Robinson.

Physical Medicine (at Harrogate). Annual General Meeting.

SATURDAY.

Physical Medicine (at Harrogate).

MEDICAL SOCIETY OF INDIVIDUAL PSYCHOLOGY.

THURSDAY, May 10th.—8.30 P.M. (at 11, Chandos-street, W.), Dr. Mary Ferguson and Dr. Hilda Weber: Case Reports Illustrating Menopausal and Post-menopausal Neuroses.

SOUTH-WEST LONDON MEDICAL SOCIETY, Bolingbroke Hospital, Bolingbroke-grove, Wandsworth Common.

WEDNESDAY, May 9th.—9 P.M., Mr. C. P. G. Wakeley: Head Injuries.

PADDINGTON MEDICAL SOCIETY.

TUESDAY, May 8th.—9 P.M. (at the Gt. Western Royal Hotel, Paddington), Addresses by Representatives on the Work of the London Panel Committee. The meeting will be open for discussion on any matter connected with the N.H.I.

accelerated and 8 months after the commencement of treatment the eczema had completely cleared up.

That was three months ago and James' skin is still clear and there have been no further attacks of asthma.

ETHEL was the elder of two girls with a young, hearty mother and an affectionate father. She wept most of the day, started when spoken to and was terrified of the dark. No medical reason for her pale face and thin body and the dark rings under her eyes could be discovered. At school she was said to be exceedingly slow and unable to concentrate. During her work at the Institute, layer upon layer of fear and struggle were shown to be in her mind. The bluff, hearty mother, having no other outlet for her practical emotions, had found it impossible to allow Ethel to grow out of that state of babyhood in which everything had to be done for her. The violent revolt of the child's nature resulted in the fears and nervousness.

When Ethel first came to the Institute she sat about listlessly and was unable to carry out any task calling for concentration. Later, she quickly improved. Interviews with the mother modified her attitude to the child. Through the work carried out in the playroom the inhibitions in Ethel's mind slowly cleared away, her physique and appearance improved, and, from being a backward child, she became, by the time she was discharged, equal in ability to any normal child of her age.

Further information may be obtained from the Secretary of the Institute at 26, Warwick-avenue, London, W.9.

BUDGET RELIEF ON SMALL INCOMES

CHARTERED ACCOUNTANT, who as a member of a recognised professional body does not subscribe his name, writes: "With reference to the paragraph in your journal of last week drawing attention to the limited relief given by the Budget to those with small incomes, much of the point made by the income-tax consultant was lost in the choice of examples which he gave. The emergency budget of 1931–32 increased the standard rate from 4*s*. 6*d*. to 5*s*., at the same time cutting severely the allowances; in 1934–35 the standard rate is again reduced but none of the allowance cuts are restored, entailing a definite hardship. Taking a married man with one child whose income is all earned, the following table shows that the load on moderate incomes is still a severe one and, further, that the lower the income the greater the hardship still endured.

Income.	Income tax.			Increase 1934–35 over 1930–31
	1930–31	1933–34	1934–35	
£1250	£139 1 6	£178 2 6	£160 6 3	£21 4 9
650	26 10 0	58 2 6	52 6 3	25 16 3
400	4 16 0	15 0 0	13 10 0	8 14 0

The taxation burden of the £1250 a year man is 15 per cent. greater than in 1930–31, whereas his poorer countrymen at £650 and £400 bear an increased load for the current year of no less than 97 per cent. and 181 per cent. respectively compared with pre-emergency conditions. The restoration of the allowances to 1930–31 figures would have given greater benefit to the professional classes as a whole than the 6*d*. cut in the standard rate of tax."

FUN IN BED[1]

WE have here brought together a number of essays, rhymes, jokes, and problems with the view of cheering the later stages of the sojourn in the hospital or nursing-home by suitable reading. The menu is so varied that every palate must find in it some item that is agreeable, and as a whole a ludicrous feast is provided. Some of the old facetiæ were worth reproducing, some were not, but even in such a comment it should be remembered that there is no standard by which what is generally amusing can be assessed. "The secret of a quick cure," says the editor to the patient, "is to relieve your boredom but not to increase your fatigue," and he and his distinguished collaborators, alive and dead, have done much in the indicated directions. The fun for the intelligent reader lies in the malicious fact that both he and his illnesses, and his doctors, nurses, and their ministrations, are all being mocked at. As a rule the gibes are either in themselves good-natured, or are related to such preposterous circumstances that no serious wound is inflicted. But this is not always so, and the portrait of Miss Lyons as drawn by Mr. Ring Lardner, is a loving piece of cruelty.

IN reference to Prof. E. H. Kettle's article on the Detection of Dangerous Dusts, published in our last issue, it should have been stated that this work was done under a grant for expenses from the Medical Research Council.

THE MAKING OF MODERN SPECTACLES.—Theodore Hamblin, Ltd., have issued an invitation to ophthalmic surgeons to their works at 28–32, Aybrook-street, London, W. 1 (near High-street, Marylebone), for a demonstration in the making of modern spectacles and ophthalmological instruments. The production of lantern slides for teaching purposes will also be shown. Up to the end of June the demonstration takes place on any week-day at 10.30 A.M. or 2.30 P.M.; Saturdays at 10.30 A.M. only. A tour of the works takes a little under two hours.

Appointments

HARVEY, R. S., M.B., B.S. Lond., has been appointed Hon. Medical Officer in Charge, Injection Clinic, Royal Waterloo Hospital for Children and Women.

MILLER, ARTHUR, F.R.C.S. Edin., D.L.O., Assistant Aurist, London County Council.

NIXON, WILLIAM C. W., M.D. Lond., F.R.C.S. Eng., M.C.O.G., Assistant Obstetric Surgeon, with Charge of Out-patients, to St. Mary's Hospital.

Sheffield Royal Infirmary: WAYNE, E. J., M.B., Ch.B. Leeds, M.R.C.P., Hon. Associate Physician; and RAYNER, G. H., L.D.S. Sheff., Hon. Asst. Dental Surgeon.

Certifying Surgeons under the Factory and Workshop Acts: GRANT, R., M.B., Ch.B. Edin. (Falkirk); MILLER, A., M.B., Ch.B. Glasg. (Larkhall, Lanarkshire); and SAVAGE, E., L.R.C.P. Lond., M.R.C.S. (Caerphilly).

Births, Marriages, and Deaths

BIRTHS

ASERMAN.—On April 24th, at St. John's Wood-terrace, N.W., the wife of Dr. David Aserman, of a daughter.

FORD.—On April 26th, at a nursing-home, the wife of Dr. R. Kelson Ford, St. Olave's Hospital, Rotherhithe, S.E., of a son.

KNOX.—On April 23rd, at High-street, Tring, Herts, the wife of Dr. Norman Knox, of a daughter.

SWINDELL.—On April 28th, at Westwood-road, Southampton, the wife of Dr. R. S. Swindell, of a son.

MARRIAGES

NIXON—YSEBRAND.—On Feb. 19th, William Nixon, M.D., F.R.C.S., to Miss Vroukje (Vennie) Ysebrand, daughter of the late Mr. and Mrs. Hendrick Ysebrand, of The Hague, Holland, and Durban, South Africa.

DEATHS

RIDDELL.—On April 26th, at Holly House, Plumstead Common-road, Woolwich, Dr. D. F. Riddell, M.C., M.A., M.B., Ch.B., D.P.H.

RUTHERFORD.—On April 25th, suddenly, from heart failure, at Budleigh Salterton, Vickerman H. Rutherford, M.A., M.B., of [illegible] 's Park, N.W., aged 73.

SPREAT.—On [illegible] Oakleigh Park, Frank Arthur S[illegible]

STURGE.—On [illegible] an accident, William Howard Sturge, M.D., of Hoddesdon, Herts.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

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[1] Fun in Bed: The Convalescents' Handbook. Edited by Frank Scully. London: Wm. Heinemann, Ltd. 1934. Pp. 271. 7*s*. 6*d*.

ADDRESSES AND ORIGINAL ARTICLES

THE HORMONES AND THEIR CHEMICAL RELATIONS *

BY E. C. DODDS, M.V.O., M.D., D.Sc., F.R.C.P. Lond.

COURTAULD PROFESSOR OF BIOCHEMISTRY IN THE UNIVERSITY OF LONDON; DIRECTOR OF THE COURTAULD INSTITUTE OF BIOCHEMISTRY AT THE MIDDLESEX HOSPITAL

LECTURE II

Synthetic Compounds resembling Œstrin

THE constitution of the œstrus-producing hormone and the pharmacologically active derivatives have already been discussed. As pointed out, the actual synthesis of the œstrin molecule is fraught with the very greatest difficulty, and it was decided to investigate the activity of synthetic organic compounds whose structure resembled in one direction or another that of œstrin (Cook and Dodds, 1933; Cook, Dodds, and Hewett, 1933; Cook, Dodds, Hewett, and Lawson, 1934; Cook, Dodds, and Greenwood, 1934).

Since œstrin contains a partly hydrogenated phenanthrene system containing oxygen groups, it seemed natural first to investigate simpler compounds of this type. Phenanthrene itself was found to be completely inactive, but the compound 1-keto-1 : 2 : 3 : 4-tetrahydro-phenanthrene was found to possess definite œstrogenic activity; this compound is represented by the formula shown in Fig. 7. When this is injected in doses of 100 mg. into castrated rats, it was found that within some 40 hours full œstrus had developed, including uterine changes. The œstrus is of very prolonged duration, lasting in some cases for 20 days. It would appear therefore that it is possible to reproduce all the known phenomena of œstrus in the rat and mouse with this compound. Moreover, when it is injected into immature female mice, premature puberty is induced. In the immature female rat and mouse the vagina is represented by a solid cord of cells which become canalised either at puberty or following the injection of œstrin. This keto-tetrahydro-phenanthrene compound is capable of causing canalisation of the vagina, and of inducing œstrus in these animals.

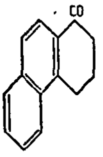

FIG. 7
1-Keto-1 : 2 : 3 : 4-tetrahydrophenanthrene.

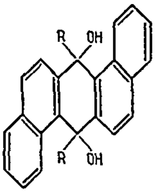

FIG. 8
Dibenzanthracene diols.

Another series of compounds have been very carefully studied and these include derivatives of 1 : 2 : 5 : 6-dibenzanthracene in which the ring-system is partly reduced and hydroxyl groups introduced.

It will be observed that the molecules of these substances are symmetrical, and that each half of the molecule is of the same type as 1-keto-1 : 2 : 3 : 4-tetrahydro-phenanthrene. A series of diols having the general constitution 9 : 10-dihydroxy-9 : 10-dialkyl-9 : 10-dihydro-1 : 2 : 5 : 6-dibenzanthracene have been investigated; the graphic formula is seen in Fig. 8.

Now if the di-methyl compound be made, this, when injected, is without activity in doses of 100 mg. The di-ethyl compound, however, shows evidence of activity in doses as small as 1 mg. It is thus over 100 times as potent as the keto-tetrahydro-phenanthrene compound.

Ascending the alkyl series, we next encounter the di-*n*-propyl, and the activity of this compound is so great that 0·025 mg. will produce all the signs of œstrus in castrated rats. It is thus 40 times as active as the di-ethyl, and 4000 times as active as the phenanthrene compound. This substance is considerably more active than the tri-hydroxy-œstrin, which is one of the natural œstrus-producing agents.

Ascending the series still further we find the next homologue in di-*n*-butyl: this shows less activity than the di-*n*-propyl in that 0·1 mg. represents the effective unit. That is to say, it has about quarter the activity of the di-*n*-propyl compound.

Increasing the length of the side-chain shows that the di-*n*-amyl homologue is inactive, whilst the six-carbon atom side-chain in the next homologue, the di-*n*-hexyl, is also inactive. Table I. shows the relative activity of members of this series.

TABLE I.—*The Activity of Members of the Series* 9 : 10-dihydroxy-9 : 10-dialkyl-9 : 10-dihydro-1 : 2 : 5 : 6-dibenzanthracene.

Substance.	No. of animals.	Dose in mg.	Per cent. positive.	Remarks.
Di-methyl ..	Rats, 5	100	nil	—
Di-ethyl ..	,, 5	100	100	Œstrus lasted 13 days.
	,, 5	10	100	,, ,, 13 ,,
	,, 5	1·0	100	,, ,, 6 ,,
Di-*n*-propyl	,, 5	5	100	—
	,, 5	1·0	100	—
	,, 5	0·1	60	—
	,, 10	0·05	80	—
	,, 10	0·025	40	—
Di-*n*-butyl	,, 10	100	100	Œstrus lasted 28 days, animals then killed.
	,, 9	1·0	50	Œstrus lasted 48 hours.
	,, 14	0·1	50	,, ,, 36 ,,
	Mice 11	1·0	100	Animals in œstrus when killed on 10th day.
	Rats, 10	10	90	Suspension in water per os.
	,, 10	1·0	10	
Di-*n*-amyl ..	,, 5	100	nil	—
Di-*n*-hexyl ..	,, 3	100	nil	—
1-keto-1 : 2 : 3 : 4-tetrahydro-phenanthrene	Rats, 36	100	100	Œstrus lasted 20 days.
	,, 5	100	nil	Suspension in water administered per os.

This is a very instructive series, since it shows how the chemist can manufacture what might be termed a skeleton key with which to open the œstrus lock. The real key is ketohydroxy-œstrin, which is produced by the body. The skeleton key is the dibenzanthracene compound which we have indicated. By building up artificial teeth, so to speak, on the key, it is possible to open the lock with difficulty with the di-ethyl; but by putting on another tooth in the di-propyl, the lock slides back with ease, in fact, with just as much ease as with one of the real keys provided by nature. Another tooth in the di-butyl compound makes the key a little stiff, whilst yet another in the di-amyl makes it jam. It is also possible to show that these compounds, when administered, give an increase in the size of the uterus similar to that which occurs in natural œstrus.

In order to prove that the lock has been genuinely opened and not forced, it can be shown by a further series of experiments the effect of two of these compounds on the plumage of the capon (Cook, Dodds, and Greenwood, 1934). It is a well-known fact that the brown leghorn capon retains its male plumage, and if large doses of œstrin are injected subcutaneously into such a bird, the plumage changes from male to female. We were able to show that with two of these compounds—namely, 1-keto-1 : 2 : 3 : 4-tetrahydro-phenanthrene and 9 : 10-dihydroxy-9 : 10-di-*n*-butyl-9 : 10-dihydro-1 : 2 : 5 : 6-dibenzanthracene—even this lock was capable of responding to our synthetic key. Fig. 9 shows the effect on the plumage of injecting these compounds. The birds were brown leghorn capons whose plumage showed male characteristics. On injecting the compounds mentioned it can be seen that in the growing feathers there is a rapid change from the male to the female type. This is particularly well shown in feathers from the breast region. The markings in the illustration indicate the male and female areas in the feathers, but the striking character of these changes cannot of course be fully appreciated without coloured reproduction.

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* The Goulstonian lectures for 1934, delivered before the Royal College of Physicians of London on March 6th, 8th, and 13th. Lecture I. appeared in our last issue and Lecture III. will be published next week.

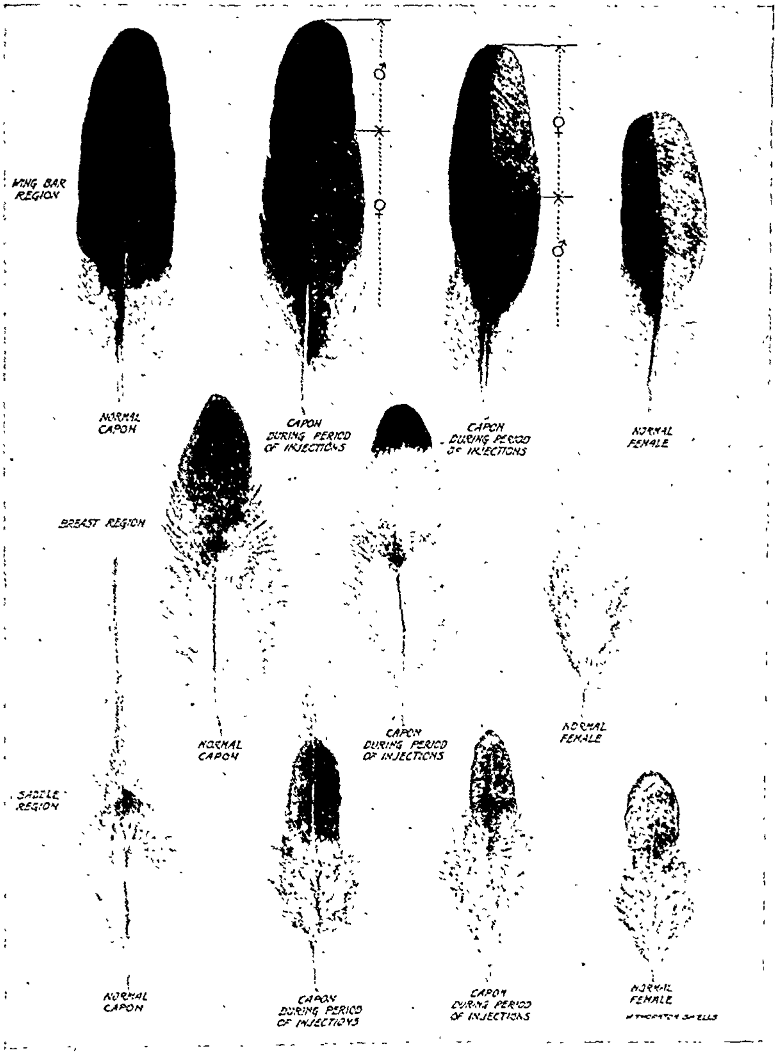

WING BAR REGION
♂
♀
♀
♂
NORMAL CAPON
CAPON DURING PERIOD OF INJECTIONS
CAPON DURING PERIOD OF INJECTIONS
NORMAL FEMALE
BREAST REGION
NORMAL CAPON
CAPON DURING PERIOD OF INJECTIONS
NORMAL FEMALE
SADDLE REGION
NORMAL CAPON
CAPON DURING PERIOD OF INJECTIONS
CAPON DURING PERIOD OF INJECTIONS
NORMAL FEMALE

FIG. 9.—Effect of 1-Keto-1 : 2 : 3 : 4-tetrahydrophenanthrene on plumage of capons.

We can state, therefore, that, in so far as is known up to the present, these compounds possess all the known activity of the natural œstrus-producing hormone.

Specificity of Hormones

The significance of these observations is considerable, since they throw grave doubt on the question of specificity of hormones. The original conception postulated that hormone action was one of the most specific. Whilst it is known that para-hydroxy-phenols and their derivatives are capable of causing a slight rise of blood pressure, it would have been deemed incredible that so complicated a series of events as occur in the œstrus cycle could be initiated and maintained by any other than the naturally occurring hormone. Here, however, we see compounds of somewhat differing structures which are capable of reproducing the whole phenomenon, not only in mammals, but also in birds. *It appears justifiable to assume that there are certain parts of the œstrin molecule which are necessary to reproduce the physiological activity, and that these compounds of ours also possess this.*

The significance of this to the organic chemist is great, since *it may mean that it is not necessary* to synthesise the whole of the elaborate molecules that occur in nature, but that skeleton keys may possibly be found for many of the other hormones. At the present time it is impossible to state the exact groupings necessary in the substances for this activity. In all the active compounds the phenanthrene nucleus is to be seen. We now know, however, that even this is not essential, since we have found evidence of œstrogenic activity with the derivative of anthracene—namely, 1-keto-1 : 2 : 3 : 4 : 5 : 6 : 7 : 8-octa-hydro-anthracene—which is represented in Fig. 10. Research has been extended on these lines, and *it is possible to state from unpublished data (Cook, Dodds, and Lawson) that definitely active anthracene derivatives may be obtained.* The important factors seem to be a certain degree of unsaturation in a condensed carbon ring-system together with polar groups. These are probably necessary for a high order of activity, although definite activity of a low order was shown by some compounds which contain no oxygen. A great many compounds were tested with negative results.

These results provide a possible explanation for the very remarkable experiments carried out by Aschheim and Hohlweg (1933), who show that the extraction of a wide variety of bituminous substances is capable of yielding products with very definite œstrogenic activity.

Certain coals, mineral oils, &c. were used as starting material in the preparation of the œstrogenic substance. Aschheim and Hohlweg advanced the very attractive theory that this œstrogenic substance in coal was in effect that variety of the œstrus hormone that is known to be present in plants, and which was later called *tokokinin*. It has been shown that tokokinin has the same constitution as keto-hydroxy-œstrin, and according to Aschheim and Hohlweg's ingenious theory, the œstrogenic activity of extracts from coal could be attributed to the tokokinin of primeval forests which had been preserved in the form of coal. In view, however, of our results it would appear that such an assumption is not necessary, since it is well known that extracts of coal will contain compounds of the same type of structure as those which have been proved to be capable of giving rise to œstrus. We ourselves have shown that certain of the ulmins of coal possess definite œstrogenic activity.

In order to complete a review of compounds capable of causing œstrus apart from the naturally occurring hormone, it is necessary to refer to the statement made by Coke (1930) that clupanodonic acid possesses marked œstrus-producing activity. Now this compound is a straight chain, unsaturated fatty acid obtained from certain fish oils. A very careful investigation has been made into this problem, but it has been found impossible to confirm the œstrus-producing activity of this compound. We were able, however, to demonstrate low-grade activity in certain highly unsaturated fatty acids of the general formula of clupanodonic acid.

This raises the very interesting possibility that perhaps the body possesses the power of converting the straight chain into a carbon ring compound. From the chemical point of view it has been proved that cyclisation of such a highly unsaturated compound does occur (Edisbury, Morton, and Lovern, 1933). As, however, the activity is so small, the other possibility—namely, that the fish oils contained a trace of œstrin which was not eliminated in the purification process—must be borne in mind. Up to the present, therefore, it is safe to say that all the synthetic œstrus-producing substances appear to belong to the condensed carbon ring system, and that the most powerful possess the phenanthrene nucleus.

Carcinogenesis and Œstrogenesis

The hydrogenated phenanthrene ring type of compound, as already pointed out, has only recently been recognised as a normal constituent of the body. A list of the typical compounds of the body belonging to this group has been given earlier together with the structural formulæ. Mainly through the work of E. L. Kennaway and his co-workers at the Cancer Hospital, it has been proved that a carcinogenic agent present in tar also belongs to this particular type of chemical compound (Kennaway, 1924, 1925, 1930; Cook, Hieger, Kennaway, and Mayneord, 1932; Cook, 1932). It will here be necessary to consider the question of carcinogenesis in some detail.

The observations of industrial cancer led to the suspicion that tar was capable of producing malignant disease when applied to the skin. This was first proved by Yamagiwa and Ichikawa (1915, 1917, 1918) who, in 1915, were able to demonstrate experimentally that on application of tar to the skin of rabbits an epitheliomatous condition in a large proportion of cases resulted. Tsutsui (1918) repeated these experiments with mice in 1918, and this was confirmed by Passey in 1921 who used soot (Passey, 1922). It was found necessary to continue the experimental painting for very long periods, and nine months to a year was frequently necessary in order to produce a malignant tumour.

It was at first assumed that the tar acted by producing a chronic irritation which later became the subject of malignant change. Doubt, however, was cast on this view by the observation that not all tars were capable of causing malignant changes. In a very important investigation Kennaway (1924, 1925) showed that the carcinogenic agent could be produced by heating acetylene or isoprene in the presence of hydrogen. This proved conclusively that it was possible to obtain a carcinogenic agent which contained only carbon and hydrogen. Mayneord in 1927 studied the fluorescent spectrum of these synthetic mixtures, and observed the similarity of the spectrum to that of the carcinogenic tar. This work, which was continued by Hieger, suggested that the mixtures contained hydrocarbons of the polycyclic aromatic type. An investigation was at once commenced on the synthesis of a series of these compounds and a study of them from the point of view of their ability to produce carcinoma when painted on to the skin of mice. In a number of papers these workers (Cook, 1932; Cook, Hewett and Hieger, 1932; Cook, Hieger, Kennaway, and Mayneord, 1932) showed that a series of compounds related to 1 : 2-benzanthracene possessed carcinogenic properties. The only compounds of this series that we need consider at the present time are 1 : 2 : 5 : 6-dibenzanthracene, 1 : 2-benzpyrene, and 5 : 6-*cyclo*penteno-1 : 2-benzanthracene (Fig. 11). It can be seen at a glance that these carcinogenic compounds bear some resemblance to the group of substances that we discussed earlier.

The gradual elucidation of the structure of cholesterol, vitamin D, and the sex hormones has increased the theoretical importance of the work of Kennaway and his colleagues, since prior to these investigations it might have been argued that the production of tar cancer was of purely academic interest, as the carcinogenic agents apparently bore no relationship to substances taking part in the composition of the body. Their extensive investigations, however, have shown that the carcinogenic hydrocarbons belong to this form of condensed carbon ring compounds, and, as has been pointed out by Cook, the processes which would be entailed by the formation of these compounds from the naturally occurring sterols and bile acids would involve reduction, dehydration, and dehydrogenation, and might readily occur in the animal body; it seems possible that these carcinogenics might result from these processes operating upon degradation products of sterol metabolism (Cook, 1933).

The most potent synthetic œstrus-producing agent obtained by us is 9 : 10-dihydroxy-9 : 10-di-*n*-propyl-9 : 10-dihydro-1 : 2 : 5 : 6-dibenzanthracene which, it can be seen, is a derivative of 1 : 2 : 5 : 6-dibenzanthracene, the carcinogenic hydrocarbon (Fig. 12).

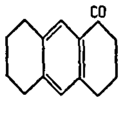


FIG. 10
1-Keto-1 : 2 : 3 : 4 : 5 : 6 : 7 : 8-octa-hydro-anthracene.

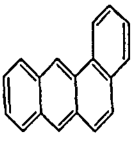
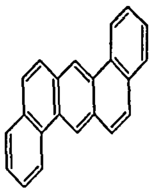
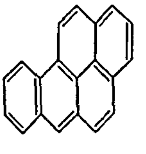


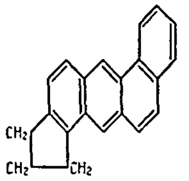
FIG. 11.—1 : 2-Benzanthracene.



1 : 2 : 5 : 6-Dibenzanthracene



1 : 2-Benzpyrene.



5 : 6-*cyclo*-Penteno-1 : 2-benzanthracene.

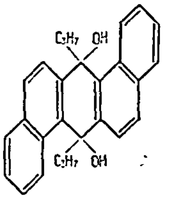


FIG. 12
9 : 10-Dihydroxy-9 : 10-di-*n*-propyl-9 : 10-dihydro-1 : 2 : 5 : 6-dibenzanthracene.

In view of the resemblance of the molecular structure of these two compounds, it was decided to investigate the carcinogenic hydrocarbons to see whether they possessed any œstrogenic activity. Accordingly a series of tests were made in which 1 : 2 : 5 : 6-dibenzanthracene, 1 : 2-benzpyrene, and 5 : 6-*cyclo*penteno-1 : 2-benzanthracene were used. With 1 : 2 : 5 : 6-dibenzanthracene completely negative results were obtained; but with the 1 : 2-benzpyrene and the 5 : 6-*cyclo*penteno-1 : 2-benzanthracene it was found possible to produce a full œstrus response by the injection of 100 mg. of the compound. The usual strict criteria for true œstrus was applied rigorously in these two instances, and the net results of these investigations establish the fact that these two compounds possess dual activity—namely, the power of carcinogenesis and œstrogenesis (Cook and Dodds, 1933). It must, however, be pointed out that the œstrogenic action, though definite, is only feeble, and that the main pharmacological action of these compounds lies in their carcinogenic powers. For example, the dibenzanthracene molecule is carcinogenic in the aromatic state, but œstrogenic when suitably hydrogenated and supplied with hydroxyl groups.

I believe that this is the first instance of the description of two entirely separate actions of a single molecule, and this again throws considerable doubt on the whole conception of hormone activity; not only have we already proved the lack of specificity of hormones, but have proved now that a single substance of known constitution may have at least two entirely separate actions initiating such differing processes as œstrus and the production of carcinoma. There is not at the moment sufficient evidence to warrant a great deal of speculation, but two possible thoughts arise to the mind: either the phenomena of œstrus and carcinoma are closely related or, alternatively, the carcinogenic hydrocarbons bear the same relationship to the production of cancer that the synthetic œstrus-producing agents bear to the œstrus phenomenon—namely, that they are both skeleton keys. It must be admitted that the excessive cellular proliferation occurring in the early stages of œstrus bears a superficial resemblance to certain phases of carcinoma.

Œstrogenic Activity of Vitamin D

As has already been mentioned, the condensed carbon ring group of compounds also includes vitamin D or calciferol. The vast amount of chemical work that has been pursued on this subject has shown that it is possible to take the inert sterol, ergosterol, and by irradiation with ultra-violet light under suitable conditions, to confer upon it the activity associated with vitamin D. By the application of chemical methods it has been possible to isolate in crystalline form the vitamin from the products of irradiation, but the exact constitution of this substance is not yet determined. The formula of ergosterol is shown in Fig. 13. From what is known of its constitution at the present time it can be seen that it is at any rate closely related to the group of compounds that we have discussed.

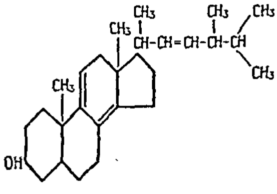


FIG. 13.—Ergosterol.

Bearing in mind the very remarkable observations on the dual activity of benzpyrene and 5 : 6-*cyclo*penteno-1 : 2-benzanthracene, it was felt that a careful trial of sterols related to ergosterol and calciferol for œstrus-producing activity would be interesting. Again, the same elaborate precautions were taken to be sure that any effects produced represented the whole of the œstrus phenomenon. The ovariectomised animals were injected with a solution of the sterol in oil, and 100 mg. were administered in each case. It was found that the greatest activity was possessed by neo-ergosterol; 40 per cent. of the animals injected with this compound developed full œstrus. In the case of calciferol full œstrus was developed in 20 per cent. of the animals, while with ergosterol 20 per cent. of the animals also showed definite evidence of œstrus-producing activity.

In all cases a number of animals were killed at the height of œstrus, and the characteristic enlargement and distention of the uterus was found. In the case of those injected with calciferol, the animals died at a later date with the characteristic symptoms of hypervitaminosis, but it must be emphasised that the œstrus changes occurred before there was any sign of intoxication. It must of course be borne in mind that the amount of calciferol required to produce œstrus is quite out of proportion to that required to protect an animal against rickets.

An interesting point was brought out by running a series of control animals which were injected with parathormone. These animals developed a hypercalcæmia similar to that obtained in hypervitaminosis, but no œstrus resulted. One can therefore definitely state that elevation of blood calcium does not produce œstrus, and that the œstrogenic activity of vitamin D appears to be quite apart from its power to raise the blood calcium content.

We have therefore a very striking confirmation of the observation that a single molecule may possess at least two entirely separate physiological effects, in this case antirachitic and œstrogenic activity. Until this observation was made this dual activity had only been observed with the synthetic carcinogenic hydrocarbons. In the case of vitamin D, however, we were able to reproduce the same phenomena with a naturally occurring substance. Again, it is too early to speculate upon the theoretical process underlying these surprising observations. It seems impossible to imagine that all these groups of compounds are converted in the body of the ovariectomised animal into œstrin, and there is certainly no evidence for such an assumption at the present time. In any case, these observations taken all together indicate the extreme importance of the

TABLE II.—*Relative Potencies of Sterols*

Substance.	No. of rats	Dose in mg.	Per cent. positive.	Remarks.	Method of Preparation.
5 : 6-*cyclo*penteno-1 : 2-benzanthracene ..	10	100	30	—	Cook (1931).
1 : 2-benzpyrene ..	10	100	30	—	Cook, Hewett, Hieger (1933).
Neo-ergosterol ..	10	100	40	—	Inhoffen(1932).
Calciferol	10	100	20	3 died.	—
Ergosterol	10	100	20	All died.	—
1 : 9-dimethyl-phenanthrene ..	5	100	60	—	Haworth and Mavin (1932).
Clupanodonic acid (after treatment with bromine)	5	50	50	1 died.	—
Coal ulmins	5	100	40	—	—

sterol group in the metabolism, not only of animals, but also of human beings. Whether the phenomena associated with rickets, malignant disease, and sex activity are all related, or whether all the locks are capable of being opened by skeleton keys, remains yet to be proved. It can be seen that in this particular sterol group there is no œstrogenic activity with cholesterol, but the potency increases with the increasing degree of unsaturation rising to a maximum in the case of neo-ergosterol. Table II. indicates the relative potencies of vitamin D, &c.

The Thyrotropic Hormone

It will be remembered that in Lecture I. the various hormones secreted by the anterior lobe of the pituitary were discussed, and amongst them appeared the thyrotropic hormone. It would seem that this hormone bears a very similar relationship to the thyroid to that which prolan bears to the ovary. We have already seen that prolan acts upon the ovary and stimulates it to produce œstrin and allied compounds. The thyrotropic hormone stimulates the thyroid to produce its own hormone, thyroxine. It will perhaps be advisable to review very briefly the experimental evidence of the existence of the thyrotropic hormone.

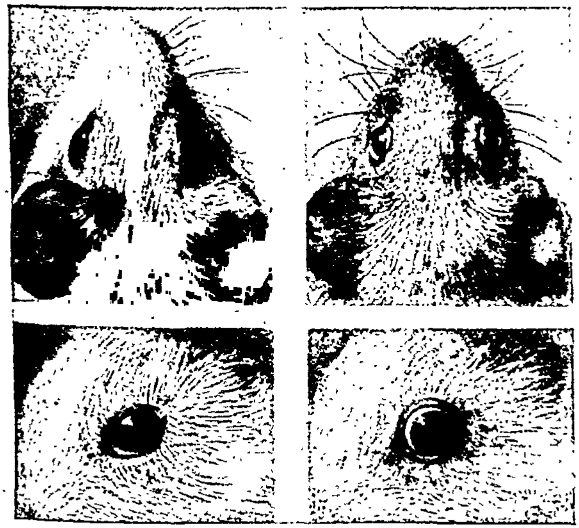


FIG. 14.—Exophthalmos in the guinea-pig. Reproduced from the *Bulletin* of the Johns Hopkins Hospital.

As in the case of prolan in relation to the ovary, the evidence produced by a study of cases of Simmonds's disease indicates the connexion between the anterior lobe of the pituitary and the thyroid gland. It has also been shown that removal of the pituitary gland causes either reduction of development or atrophy of the thyroid (Adler, 1914; Allen, 1916: Smith, 1916; Foster and Smith, 1926; Smith, 1927; Richter and Wislocki, 1930). Several of these observers noted the decrease in basal metabolic rate, and Foster and Smith (1926) and also Richter and Wislocki (1930) noted that the changes can be prevented by injection of an extract of the anterior lobe. Moreover, the addition of an extract of the anterior lobe of the pituitary to the fluid in which axolotls are kept initiates a metamorphosis. The metamorphosis is preceded by hyperplasia of the thyroid gland.

In 1929 Max Aron published an account of the action of an extract of the anterior lobe of the hypophysis upon the thyroid of the guinea-pig. In a later series of papers in 1930 he reported a very careful study of this hormone and showed that there was great hypertrophy of the parenchyma of the gland associated with liquefaction and final disappearance of the colloid; if the injections be discontinued the thyroid gland returns to its normal state (Aron, 1929 and 1930,[1, 2]).

Krogh, Lindberg, and Okkels (1932) made a very careful histological investigation of the thyroids of guinea-pigs following prolonged treatment with anterior lobe extract; they maintained that whilst the glands gave the appearance of having returned to normal after cessation of injections, it was found that the Golgi apparatus still showed the hyperplasia in increase which is characteristic of Graves's disease.

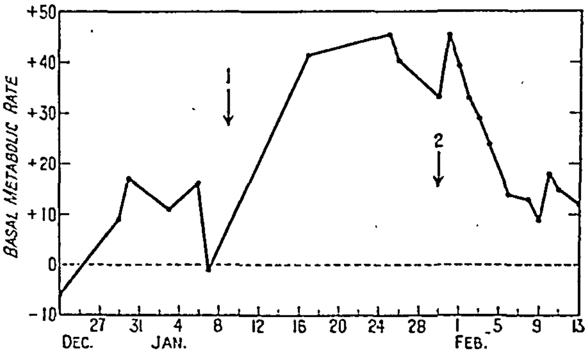


FIG. 15.—Chart showing effect of thyrotropic hormone on the basal metabolic rate of a woman (age 27). Administration of the hormone, in doses of 600 mouse units daily, was begun at the point marked 1 (Jan. 9th) and was stopped at 2 (Jan. 30th).

Some of the first observers to study the effects of the hormone upon the basal metabolic rate of animals were Verzár and Wahl (1931). They showed that it is possible to increase the basal metabolic rate to a very considerable level and that this falls on withdrawing the extract. They further made the interesting observation that this rise in basal metabolic rate could be controlled by the administration of potassium iodide. It was also found impossible to produce hyperactivity of the thyroid in an animal receiving large doses of potassium iodide. This observation was also made independently in my laboratory.

It is very interesting to compare this phenomenon with the well-known effect of iodine in reducing the high basal metabolic rate in persons with thyrotoxicosis. In general it may be stated that the increase in basal metabolic rate is directly dependent upon the amount injected.

A still further effect of this hormone is the production of exophthalmos in animals. This has been successfully demonstrated by Hogben (1922–23) and by Spaul (1923–24); it has also been observed in ducks and guinea-pigs by Schockaert (1931[1, 2] and 1932) and by Loeb and Friedman (1931–32.) The following illustration is reproduced from a paper by Friedgood (1934) and shows very clearly the marked exophthalmos occurring in a guinea-pig (Fig. 14.)

It would appear that here we have an experimental method of producing Graves's disease, and as in the case of Graves's disease the condition can be controlled by the administration of iodine.

With regard to the chemical properties of the extract, very little at present is known. It is apparently of a protein character and is readily destroyed by heat and in alkaline solution. It seems, therefore, to belong to the protein group and to correspond in properties roughly with hormones such as prolan and insulin. The accompaning chart shows a typical experiment made in my laboratory upon a volunteer with this material (Fig. 15).

Guinea-pigs were used for the animal experiments and their oxygen consumption was measured by a modified Krogh apparatus.

I have made a very careful study of the urine of patients suffering from Graves's disease and thyrotoxicosis in the hope of finding a hormone in the urine in the same manner that one finds prolan in the case of pregnancy, but so far no conclusive evidence has been obtained. By a modification of the method of Dickens (1930) for the separation of prolan, it was possible to obtain definite though small yields of a thyrotropic substance. It has, of course, been conclusively shown by many observers that this hormone is without effect upon the basal metabolic rate of animals from whom the thyroid has been removed. We can see, therefore, that the relationship of the pituitary gland to the thyroid resembles in many respects the relationship that it holds to the ovary.

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ROYAL FREE HOSPITAL.—At the annual meeting recently, Lord Riddell, the president, stated that during the past year an average of 1000 patients had been treated daily, including 100 children in the Eastman Dental Clinic. The nurses' home had been completed at a cost of about £150,000; two new wards were opened for ear, nose, and throat cases, with 30 beds and a theatre; the pay beds have been increased to 23. The Albert Levy wing at the Queen Mary building, comprising an obstetric and gynæcological out-patients' department and an electrotherapeutic and massage department, has been brought into full operation. Patients' dietaries have been revised to bring them into accord with modern ideas. Sir Hilton Young, Minister of Health, congratulated the governors upon the mortality in the maternity wards being only 2·8 per 1000, "the lowest in London, and possibly in the whole country."

INTERNATIONAL COÖPERATION IN PUBLIC HEALTH

ITS ACHIEVEMENTS AND PROSPECTS *

BY SIR GEORGE S. BUCHANAN, C.B., M.D., F.R.C.P. Lond.

The International Sanitary Convention, 1926

AFTER the war, as I have already shown, the impulse to establishment of greater confidence between countries was growing, while it had to be realised that the latest convention, though as recent as 1912, now related to a pre-war political geography that was extinct, and to States whose governments as well as whose frontiers had been radically changed. Meanwhile, also, a good deal more had been learned from the war years about international coöperation over infectious diseases, and it was clear that if any general new convention was made it could no longer be limited to cholera, plague, and yellow fever. Several countries had, for example, adopted a policy of their own to control the entry of typhus and small-pox infection at their sea or land frontiers, and action in regard to these two diseases at least required some mutual understanding in the interests of traffic and of rational hygiene. We were in great difficulties also in consequence of the way in which rat plague had spread from port to port by means of shipping, often causing human plague and, in any case, great expense in its eradication. The danger was being met by efficient methods of effectively destroying rats, particularly by cyanide fumigation, but shipping was finding itself in the impossible position of having to submit to deratisation and all the delay and cost that it involved, at one port after another, undertaken merely because the vessel had originally come from an infected country, and without regard to the previous deratisations or fumigations to which she might have been subjected in course of the same voyage. It may well be supposed that when the fumigation of a ship on which there was no evidence of any plague infection was found to cost several hundreds of pounds without producing a single dead rat, the owners became eloquent.

The difficulties of amending the 1912 Convention and adjusting it to new conditions, political and medical, were very great. Nothing could have seemed more contradictory, for example, than the post-war policies of the health services of the United States, Japan, and Great Britain on many of the questions at issue. Indeed, at one time it seemed likely that no new world-wide agreement would be possible, and that the whole matter would have to be left to particular agreements negotiated between countries or to regional agreements. This view was strongly contested by countries like our own with a large world trade, and fortunately with good effect. The convention which at present regulates all these matters—the International Sanitary Convention of Paris, 1926—drawn up by a plenipotentiary conference working on the drafts prepared by the Office International d'Hygiène publique—is world-wide in its application, and was able to be so by its being based on the adoption of new principles of international coöperation. The rat difficulty, for example,

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* The Milroy Lectures delivered before the Royal College of Physicians of London on Feb. 27th and March 1st, 1934, with a few subsequent additions of detail.

was met with by establishing the now well-known international system under which all ships are liable to examination every six months at designated ports, in order to ascertain whether they are rat-infested and should or should not be deratised. Then, again, the several infections were no longer dealt with collectively but each according to the natural history of the disease. For "infected ship" we substituted "plague-infected ship," cholera-infected ship, and so on. Next, the whole system of intercommunication between countries in regard to the prevalence of infectious diseases was altered. While diplomatic communications were preserved for certain purposes, it was the technical office in Paris which was then made directly responsible for the receipt and dissemination of the necessary information to the health departments of the signatory countries. It was here that the links with the Singapore Bureau and the Pan-American Sanitary Bureau, already described, became important.

The Office International was made responsible also for many other duties, such as the coördination of the sanitary control of the Mecca Pilgrimage, the promotion of subsidiary local agreements, and generally for a continued supervision over the way in which the Convention worked in practice. This function it has fulfilled conscientiously and thoroughly by means of a standing Quarantine Commission which meets during its half-yearly sessions, and gives its opinion for transmission to governments on any anomalies which are brought to its notice and on any matters of practice which are not defined in the Convention but require a common understanding. At recent sessions, for example, the Quarantine Commission has dealt with the standards which should be adopted for the fumigation of ships by cyanide, or sulphur, with the abolition of the aged but unvenerated requirement that ships should carry and produce bills of health in relation to the ports from which they have come, with measures for facilitating direct communication between port medical officers of adjoining countries, with the international codes of flags, signals, and wireless which are required for public health purposes, and many other relative questions. Their findings on these matters are often only arrived at after discussion at two or three sessions, during which the delegates have been in position to ascertain the views of their own governments and consult their experts; but when arrived at they have never to my knowledge been seriously questioned, and are now very widely adopted and govern the ordinary practice of port sanitary authorities

We are, of course, far from having achieved finality by the International Sanitary Convention, 1926, but it may safely be asserted that its prescriptions, when subject to constant practical consideration and revision in the way which is effected in Paris, have within the last few years almost metamorphosed the practice of port sanitary administration for the better. One anomaly after another has been removed, in each case with the object on the one hand of strengthening the national sanitary authorities in their real task of disease prevention, and on the other of saving transport and shipping from useless and unnecessary interference. The Paris Office in this matter has, I believe, come to possess the confidence both of the public health departments and the shipping interests of the maritime countries. All this, I may add, is exemplified in the changes which have been made in our own system of port sanitary administration in the United Kingdom since 1926, during which time we have given close attention at the Ministry of Health and in the Departments of Health for Scotland and Northern Ireland to the equipment and working of our port administration on the lines internationally agreed to. In recently amending and consolidating the port sanitary regulations made under national legislation in the United Kingdom, the various requirements of the Convention have received due recognition. Their working, as I have indicated, is dependent on the system by which the intelligence we obtain about infectious diseases abroad under the terms of the Convention, and also through the activities of the British Consular Service, is classified and made readily and rapidly available to port medical officers of health. This is done in the Medical Intelligence section of the Ministry of Health, chiefly by means of a confidential "Weekly Record," designed by my colleague Colonel S. P. James, which I venture to claim as a model of its kind.

The International Sanitary Convention for Aerial Navigation, 1933

The experience gained in preparing the International Sanitary Convention, 1926, encouraged the Paris Office a little later to take up a proposition originally made by the Italian representative at the time of the Peace Conference—namely, that international rules should be established in respect of the precautions to be taken to prevent the transmission of infectious disease by aircraft. At first sight this object seemed one which could be attained by enunciating a few simple and general principles. While international air-traffic did undoubtedly add a new route by which infection could be carried, the number of passengers was infinitesimal in relation to those going by sea, and, relatively speaking, they were well-to-do and responsible people. The parallel case seemed rather to be that of international journeys by train and road, for which a few simple rules, chiefly in the direction of securing the maximum of liberty and non-interference with merchandise, had sufficed. But it soon became evident that something more was wanted. The opening up of long air routes, from the East in particular, was held by certain countries which are always apprehensive of the importation of cholera—e.g., Egypt or Persia—to require the imposition on arrivals by aircraft of the same measures which had been so lately settled in Paris for arrivals by ship. Thus, passengers coming from infected or suspected countries like India were to be made liable to detention at the aerodrome, say, in Persia or in Egypt, pending the results of bacteriological examination of their stools, and special requirements were being prescribed in respect of place of landing of the aircraft itself and the movement of its crew.

Another and troublesome demand arose for evidence of the health of the places from which the aircraft had come, which took the form of expecting air traffic to be complicated with the same system of bills of health which had proved such an irksome and profitless formality in the case of shipping. In fact, we were up against several of the old questions of unnecessary and irritating measures which were not warranted by the actual risks.

There was, however, another side to it. The introduction of air traffic in certain cases has actually created a new kind of risk of introduction of infection by reason of the rapidity of air flights from distant countries. The public health authorities were within their rights and, indeed, only performing an obvious duty when they were taking measures to protect themselves against these risks. The questions, internationally, were what form the action should take, how to define it in terms of maximum measures, and how to secure a reasonable uniformity which would enable the air lines to know what was expected of them. The case with which we were principally concerned was that of yellow fever, less perhaps in respect of the existing air lines than of those which sooner or later are sure to be established between the yellow fever infected countries in Africa to other parts of that continent. Such lines are already in operation in the New World when the countries of yellow fever prevalence are traversed. The yellow fever danger, in the absence of control, was accordingly represented as being a very formidable one, seeing that all the conditions, including the presence of stegomyia, which promote the spread of yellow fever infection were present in the uninfected eastern part of Africa, and that India and other countries farther to the East, where the same position obtained, had the gravest apprehensions about the introduction by air of a disease which, on account of its natural history and methods of spread, was believed hitherto never to have gained access to their populations.

Fortunately, however, the case was one in which the establishment and observance of an agreed code of action should go a long way to the removal of any legitimate apprehensions on this ground. The key of the position was that the number of aerodromes at which countries permit arrivals from other countries is very small, for customs and political reasons. Hence there are few centres to control and at most of them access to medical services is feasible. So that, given an aerodrome used for international flight which is in a region where yellow fever exists, it is usually quite a practicable thing to keep that aerodrome and its personnel free from infection. And as to mosquitoes, it is fortunately not difficult to secure their destruction in passenger aircraft. And finally, in order to obviate the risk of the flight of passengers who have quite recently been infected and who might be able during the six days thereafter to infect stegomyia in a susceptible country, the problem is no greater than those which are constantly dealt with by any medical officer of health for other diseases. It resolves itself into medical examination and inquiry into recent movements of the passenger at those particular aerodromes where the possibility of yellow fever infection has to be considered—i.e., those which, by reason of the greater euphony of the French name, we have termed "Anti-Amaryl Aerodromes." This can, if need be, be supplemented by observation of the passenger until the end of the six-day period.

By degrees and after several sessions, and always in close consultation with representatives of air navigation, the Committee of the Office found itself therefore in a position to supplement the International Sanitary Convention, 1926, which deals with sea and land transport, by the International Sanitary Convention for Aerial Navigation, which was opened for signature at The Hague in April, 1933, and has already been signed on behalf of many important countries and their possessions. The code is sufficiently comprehensive to be applicable to American air routes, as well as to the Old World; and subject to the completion of a technical reservation, which gives no difficulty, this Convention is to be signed by the United States. It should be added that the Second Pan-American conference of Directors of Health also assisted the Office International by giving consideration and approval to the text.

Looking to the great importance attached to the yellow fever aspect of the question in West Africa and the East, it is satisfactory to note that its universal acceptance by states, dominions, and colonies in the Continent of Africa has already nearly been achieved. For this result, special recognition is due to the initiative of the Government of the Union of South Africa, which secured a conference on this and other subjects at the end of 1932 and went into the question in all its bearings. In this, the coöperation of the Health Organisation of the League of Nations proved most useful, since they not only accepted the request of the Union to convene the conference but also were represented by Dr. Park and myself as Secretary and President respectively.

Other International Health Conventions: the Brussels Agreement, 1924

The international conventions and agreements on health questions which may come before the Paris Office are by no means limited to quarantine. The Royal College of Physicians has a particular interest in one such agreement—that which settles the International List of Causes of Death (which owes much to the help given to the British delegation by our former President, Sir Humphry Rolleston) and has to be related to the Nomenclature of Diseases for which the College is responsible. But as the position of the Paris Office to that agreement is not one of direct responsibility, I will choose another example—namely, the Brussels Agreement of 1924—using a few notes from my colleague, Dr. M. T. Morgan, who in future will represent the United Kingdom on the Permanent Committee of the Paris Office, and has also been included by that committee among its nominees to the Health Committee at Geneva.

Many of us will remember our apprehensions of increase in venereal disease after demobilisation, and especially the fear we had of the introduction of severe types of syphilis from eastern and other foreign countries on the resumption of normal sea traffic. To meet this apprehension special care was taken in the United Kingdom to augment the number and increase the efficiency of our State-subsidised venereal disease clinics, and more than ordinary attention was given to this provision in our seaports. At our venereal disease clinics it has always been the practice to give the same facilities to the foreigner and to the foreign seaman as to our own nationals. But this practice was far from being general or reciprocal in all parts of the world, and we had evidence that in several ports overseas the incidence of venereal disease was very high, and that British seamen were contracting these diseases there without being treated, and were introducing the infection on their return to home ports. In these circumstances I was instructed to raise the question before the Permanent Committee of the Paris Office in the spring of 1920, and the discussions which then began ultimately materialised in an international agreement respecting facilities to be given to merchant seamen for the treatment of venereal diseases, which was signed at Brussels on Dec. 21st, 1924. This agreement, therefore, has been in operation for over nine years. It has been ratified by 16 countries, including some of the principal maritime nations of the world, and received the adherence of 24 Governments, who apply it although they have not gone through the formality of ratification. To these should be added other countries who, rather inconveniently, are not signatory, but conform fairly closely to the scheme of the Agreement. This document consists of seven articles, by which the signatory countries undertake to establish and maintain in each of their principal sea or river ports services for the treatment of venereal disease open to all merchant seamen or watermen without distinction of nationality, such services comprising modern treatment. The supply of medical necessaries, and treatment in hospital should the doctor of the service consider it essential, are to be free of charge, as also are necessary medical supplies to enable treatment to be followed on the voyage to the next port of call.

It is part of the system that each patient receives a card following an official international model which is strictly personal to himself and on which he is designated by a number only. This card records diagnosis, treatment carried out at the various centres, and the results of serological and other special examinations. Masters of ships and shipowners are to make known to the crews the existence of the services, and similar action is to be taken by port sanitary authorities. A list of the ports at which the system is working was lately published by the Paris Office and covers some 750 seaports. At the instance of the Ministry of Health this list of centres at ports at home and abroad has been distributed to our own port clinics for venereal diseases, and, through the instrumentality of the Board of Trade and shipowners, copies are also made available to seamen on British ships.

The whole system has worked well and there can be no doubt that it has not only done a good deal for the merchant seaman himself, but has checked the spread of infection among the population generally. The Paris Office last year made inquiries of all the Governments concerned in regard to the practical working of this agreement and the directions in which improvements might be desirable. It was clear from the replies that the international system is by now well known to sailors, who frequently ask for information about these centres and expect to obtain treatment there. At certain ports, however, some additional measures are needed to make the facilities better known. At other ports arrangements still have to be made for the relatively rare cases in which it is necessary to detain the seaman in hospital. Experience also suggests that certain alterations in the form of the seaman's personal card would be useful. All these details are now receiving fresh attention; I draw attention to them as an example of the special advantage of the Paris Office as a means of securing that international agreements and conventions are duly applied in practice, or revised when experience brings out some new factor which had not been taken into account when the agreement was made. There are, I believe, many international agreements on other subjects which would be in a healthier state if this principle was applied to them.

General Work of the Office International d'Hygiène Publique

It can hardly be supposed that the delegates from the health departments of over 50 countries could meet for ten days in the spring and again in the autumn and limit themselves to discussing the terms of diplomatic agreements and supervision of their application, however necessary these things may be. The fascination—I use the word advisedly—of these meetings is the use of them which has grown up, particularly under the guidance of our late President, M. Velghe, to communicate and exchange information about the particular happenings which are troubling a particular country to-day, but may well affect its neighbour to-morrow, or of which another neighbour may have special experience. One introduces, for example, the characteristics of the small-pox we have had epidemic in England during recent years; with its copious rash and classic beginnings fading off almost without fever, pustulation or pitting, and with a practically negligible mortality even in the unvaccinated. This brings out experience of "alastrim" elsewhere; it leads after one or two sessions to an understanding of the nature and geographical extent of what we now agree to call "variola minor," to the understanding that it can coexist with variola major, and presently to the adoption of these two terms in official nomenclature—incidentally to our own great convenience, administratively, in this country. We got these conclusions in this particular case because one member of the Committee, Prof. Ricardo Jorge of Lisbon, was willing to give his time and unrivalled epidemiological acumen to a survey of the world data, and prepare a report for us. Prof. Jorge has rendered us many such services, as have Dr. Jitta, Dr. Lutratio, Dr. Hamel, Dr. Tsurumi, the late Prof. Cantacuzène, and the representatives of the French and Belgian Colonial health services—it is, indeed, invidious to mention names, since one member after another takes up the particular burden for the common good. *Proximus ardet*; when Dr. Madsen tells us of epidemic myalgia, under the name of "Bornholm disease," in Denmark, we start looking for it in other Scandinavian countries, or in Poland, in Germany or England, and bring the results to the next session. The early inquiry into undulant fever in England, made for the Ministry of Health by Sir W. Dalrymple-Champneys in 1929, was the result of communications which I brought home from Paris, which showed how necessary it was to look out for this disease in Northern Europe. There have been many such.

Sometimes common action needs to be concerted between delegates although a formal agreement is recognised to be undesirable—this has been the case with the European prohibition of the importation of parrots since the psittacosis of 1929–30. If we were to stop the movements of parrots from country to country—and it was necessary—we had to act together in Europe. In this country we were at first some weeks behind other countries, and were running a definite risk of being swamped by possibly infected parrots which were denied their usual markets on the Continent. I hope that the European countries will continue to pool all their information on this subject if the Paris Office should recommend—the matter is not yet settled—that universal prohibition is no longer necessary; unfortunately it is not only with parrots that the removal of a restriction is more difficult than its original imposition.

I should end my note about the work of the International Office of Public Health in Paris by a reference to the review of its 25 years of activity, presented to us by the Director of the Office in October.[1] For all the work I have described and for much more we depend on the Director of the Office, Dr. Abt, and his deputy, M. Marignac, and the small competent personnel through whom all the regular intelligence functions of the Office under the Conventions are carried out. They have also the really considerable credit of that unique monthly publication, the Bulletin Mensuel de l'Office International d'Hygiène publique. This bulletin is authoritative as regards public health laws and regulations in different countries ; it now reproduces all the chief contributions made or presented by the delegates at the sessions, and adds abstracts and reviews selected for their international value.

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[1] Vingt-cinq ans d'activité de l'office international d'Hygiène publique, 1909–33. Par Dr. Georges Abt. Published at 195, Boulevard St. Germain. 1933.

A word must also be said here to recognise the accuracy with which this small staff deals with documents in many languages and presents them in the official language of the Office, which is French. This goes far, though obviously not far enough for English-speaking people, to compensate for the absence from our Paris meetings of the bilingual system of the League of Nations, in which there are two official languages—French and English. An English edition of the Bulletin Mensuel, if funds allowed, would certainly be of very great advantage.

Some Concluding Observations on the *International Health Organisations,* and British *participation*

I feel, in conclusion, that, notwithstanding the description I have given of the working of the organisations at Geneva and at Paris, I may still be asked a familiar question—namely, whether it is necessary that public health and medical work which is so essentially dependent on Governments and their Health Departments, should continue to be conducted in two capitals by two committees and two secretariats.

Another occasion must be taken to discuss the advantages and disadvantages of reviving and revising the Assembly project of Dec., 1920, mentioned at the beginning of these lectures—taking account of the special lines on which each of these international organs has developed, and the strength which each of them has gained, since that date. New international discussions and new conclusions on this subject will be required sooner or later. But meanwhile, from the point of view of those who participate in the work, the duplication, such as it is, gives relatively little trouble. And the advantages of the two organs functioning side by side each in the directions which I have mentioned are so great, that it is hardly desirable to raise constitutional questions about their mutual relationship unless or until some new and strong reason arises to disturb the present order of things. Objections may be made to the scheme of creation which gives us a left hand as well as a right, and there are occasional drawbacks from the right hand not knowing what the left is doing. At the same time it is our general experience that, given a good directing brain, we get on with two hands better than with one.

There are in this connexion some *imperial and domestic considerations* worth a moment's further review. No one could take part, as I have done, in the many official conferences, in the preparation of international conventions, or in the discussions at these international health offices, without realising how naturally they come to assist the mutual understanding and helpfulness of the English-speaking peoples, and here, with experience of the way in which the great public health service of the United States, under the epoch-making direction of Surgeon-General Cumming, has responded to every call for international effort, it is right to add the U.S.A. and the British Commonwealth of Nations together. It is not that the English-speaking peoples combine against those of Latin or other nationalities—in several ways the American and Australian methods are much closer to those of other countries than they are to the United Kingdom—but it comes about from the language, and also the [illegible] basic traditions of health [illegible] and medical practice.

Australia, Canada, New Zealand, the Union of South Africa, the Irish Free State, the Sudan, are all countries which adhere to the Rome Convention, 1907, and are represented by their own delegates at the Paris Office. In one or two cases where distance makes it inconvenient for the Dominion to send a representative from its health service, the Ministry of Health has been invited to permit one of its medical officers to act for and report to the Dominion Government. This practice has been found mutually convenient, particularly as it has put at the disposal of the Office International medical officers with such special experience as is possessed by my colleagues, Colonel S. P. James, the representative of New Zealand, on all tropical medicine questions, and by Colonel P. G. Stock (who was formerly Director of Medical Services in South Africa) on matters of quarantine.

Indian participation again has from the first been of great importance, seeing that it is on Indian information that we have so much to rely when we are dealing with major epidemic diseases such as cholera, plague, and severe small-pox. Until 1929 there was no separate representation for the British colonies, but the creation of the office of Medical Adviser at the Colonial Office naturally carried with it direct representation of the colonies by Dr. Stanton, which has since been continued. The results of the international work are now communicated to the public health services of practically all British colonies and dependencies and countries under British mandate, and every endeavour is made to bring British colonial problems which would help or benefit from international discussion before the Paris Committee—an endeavour which corresponds with that of the numerous colonial and overseas possessions of other countries, notably France, Belgium, and Holland. The coördination or mutual understanding of health work between adjoining colonies of different nationalities, which is so often needed, particularly in Africa, can thus be helped centrally as well as locally. On the League of Nations Health Committee also, though British Empire representation is less complete, the Indian Medical Service has been represented almost from the beginning, while most of the Dominions at one time or another have had a member drawn from their health services.

It is thus not difficult to understand how these international meetings bring together the public health services of the English-speaking nations in a way which would not otherwise be achieved. We come almost of necessity to establish a personal relationship with fellow-workers overseas which is invaluable as a time-saver when dealing with common problems.

One might even go further in enumerating the advantages of international coöperation by referring to our domestic arrangements. British representation at, and the chief work connected with, these offices naturally falls on the Ministry of Health. In this respect that Ministry inherits, through the Local Government Board, the traditions of the medical department of the Privy Council. It is to the Ministry of Health, and its medical service, that the home Government looks in the first instance for advice on questions of health policy affecting its relations with foreign countries, and through the Ministry that necessary liaisons with other departments are maintained.

But representation of His Majesty's Government in administrative matters concerning health naturally entails consultation by the Ministry of Health with many other government offices at all stages, and the making of reports which have to go to many different quarters if the representative is properly to do his business; in particular, if we are to pull our weight, the association with the Medical Research Council and its many committees and research workers must be specially close. In all these matters, what is done through these official international health offices is only half done if it is just treated as belonging to a remote corner of some one department, labelled "international," and only remembered, if at all, when a difficulty has arisen.

A delegate or member of these international committees develops, of course, a kind of special sense as to the administrative bearings of the questions with which they deal, and he may bring to the international council a special personal competence on some one subject on which he is an authority. But for most things he asks for nothing better than the position of a trusted intermediary. As an agent, he wishes to occupy a normal place in the national public health machinery, he wants others to feed him—even to overfeed him—with material to take to and bring back from the international sessions and discussions. The pleasure of the work—and I have found it a great pleasure—is its measure of the confidence and willing help of one's colleagues, in one's own department, and in all sections of the public service, given for the common benefit.

I should refer in this connexion to a useful practice by which the programme of work at Geneva and Paris is communicated to and discussed generally at the Ministry of Health with medical officers from the Medical Research Council, the Departments of Health for Scotland and for Northern Ireland, and the British Colonies, by means of a medical committee over which my colleague, Dr. T. Carnwath, now presides. The helpfulness of this arrangement can hardly be exaggerated, particularly since the ultimate output needs to be dealt with also in the same way. I must add also a word about the value of our consultations with the London School of Hygiene and Tropical Medicine, which itself has been placed in direct association with the Medical Director and Health Section at Geneva for a number of purposes, including, as I explained above, the arrangements for the reception and guidance of visitors from overseas who desire to study particular British questions. As the work which I have described goes on from strength to strength, as I think it must do, other means may be devised by which its nature and results become more used and better known than they are at present by public health officers and the medical profession generally, for example, by securing some closer association of them by our great medical colleges and universities.

HEY'S DISLOCATION

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Posterior dislocation of the proximal phalanx at the metacarpo-phalangeal joint of the thumb has drawn on itself a certain amount of notoriety owing to the fact that it is frequently impossible to reduce by ordinary manipulation. There have been several factors put forward as the cause or causes of this difficulty in reduction, such as :—

1. The head of the metacarpal being caught between (*a*) the flexor pollicis brevis and the adductor pollicis; (*b*) the two heads of the flexor pollicis brevis.
2. The tendon of the flexor pollicis longus winding itself round the neck of the metacarpal.
3. The volar accessory ligament being torn from its proximal attachment to the metacarpal, and being interposed between the bones.

The last-mentioned factor finds most general acceptance and the treatment recommended is the tenotomising of the volar accessory ligament through a puncture on the dorsal aspect of the joint.

A CASE DESCRIBED

A recent case is of interest as it was dealt with by open operation.

J. W., a girl of 7, was admitted to hospital on Sept. 2nd, 1933, after falling on the right hand. Reduction was attempted under an anæsthetic in the casualty department, but failed. On the 4th another anæsthetic was given and attempted reduction was again unsuccessful. A posterior incision was then made on the radial side of the extensor tendons and the joint opened. The dislocation of the phalanx was typical, the displacement being towards the ulnar side as well as backwards.

The volar accessory ligament had been torn from its proximal attachment and passed backwards over the base of the phalanx, its free end lying in the posterior part of the joint. Manipulation with the joint open failed, but when the ligament was pushed forward the dislocation was easily reduced, and showed no tendency to redisplacement. When the dislocation was reproduced the ligament again passed back between the joint surfaces.

REMARKS

Assuming, as is the general opinion, that the mechanism demonstrated above is the cause of the difficulty in these cases, I find it difficult to understand how tenotomy can be carried out without doing damage to structures in front of the joint, if indeed it can be carried out at all on a structure which is not on the stretch. The tenotome would have to be used fairly forcibly to be sure of piercing the volar ligament, and it would be very liable to penetrate the long flexor of the thumb. Probably the essential happening, when this procedure is carried out, is that the ligament is pushed forward out of the way, and this enables reduction to be carried out by manipulation.

In view of the damage that is liable to be done to the joint surfaces as well as other structures by a sharp instrument, it would probably be better to confine the use of the tenotome to the opening of the joint, and then to introduce some blunt instrument such as the flattened end of a Cheyne's dissector to push forward the ligament preparatory to manipulation.

Bath Mineral Water Hospital.—Last year there were 1115 admissions. This is a small decrease due, the annual report thinks, to the increased facilities in many towns, especially in London, for the outpatient treatment of rheumatism in its early stages. Each patient stayed on an average 43·2 days. The establishment of a school of massage is under consideration.

DIABETES MELLITUS IN CHILDREN

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(*Concluded from p. 950.*)

TREATMENT

Method of standardisation.—All patients are admitted to hospital as soon as possible after the diagnosis has been made and usually on the day of their first attendance. Starvation or severe restriction of diet have not been employed, except in the cases which were admitted before 1927. On admission, patients have usually been placed on a diet containing one-third to one-half of the caloric requirements for the age, the carbohydrate not exceeding 40 g. Lawrence's[16] line ration scheme (5-gramme carbohydrate lines) is used in arranging this diet. In most patients a small dose of insulin is given from the start, and this is gradually increased until the 24-hourly specimen of urine is sugar-free and the blood-sugar is within normal limits. This takes from one to four weeks and during this time the patient is kept entirely in bed. During this period any focal sepsis is treated if the patient is sufficiently fit. When the blood-sugar is consistently normal and the urine is sugar-free, the diet and insulin are increased gradually. The carbohydrate has not, as a rule, been increased at this stage to more than 80–100 g. During this stage the patient is allowed to get up. When the blood-sugar is consistently normal and the 24-hourly specimen is sugar-free on the fuller diet the patient is encouraged to be as active as possible about the ward, and if any slight symptoms of hypoglycæmia develop or the blood-sugar readings are consistently too low, the dose of insulin is reduced. Before discharge the insulin is reduced slightly because when children are leading a more active life at home they almost always require less insulin than in hospital. If septic foci have been eradicated at the beginning of treatment a greater reduction is made to allow for the late recovery from the effects of sepsis on the islet tissue. Even with this reduction it is sometimes found that further reduction of the dose is required during the first few months as an out-patient. Patients are usually kept in hospital for from one to two months. To shorten this period is undesirable and usually leads to more difficulty later on and the necessity for readmission. In hospital the details and working of the diet are explained to the parents and they are taught to measure and inject insulin. Children over 10 who are sufficiently intelligent are taught to measure and inject their own insulin. Some are taught to test their own urine for sugar.

After discharge they attend as out-patients every two months. Urines are tested and blood-sugar is estimated, and adjustments made in diet and insulin. Patients who are now taking more than 100 g. of carbohydrate have had the additional amount added during the last three years, usually after they have been taking the lower amount for a year or more. In a few of the more recent cases higher figures have been given (Cases 3, 7, 16, and 18) after the first month of treatment, but it is still too early to say how far this is satisfactory. One of these developed an infection after six months and the diet has since had to be reduced.

Energy requirements.—Adults require food for maintenance and activity. Children require in addition food for growth and to compensate for their relatively greater heat loss. This additional requirement is large. Lawrence's figures for normal children of different ages are as follows:—

Under 1 year	100	calories per kg.	6– 9 years	70–60	calories per kg.
1–2 years	90–80		10–13 years	60–50	
2–5 years	80–70		14–17 years	50–40	

Although the aim has been to give diets approximating to the normal in order to ensure normal growth and activity, this is often difficult, owing to the severity of the disease in children, even if a very large dose of insulin is given. In most of the more severe cases it has proved impossible, or inadvisable, to give the theoretical caloric requirement either because the disease is so severe that with such a diet it is impossible to keep the blood-sugar even near the normal limits or because children have been growing and living normally on a low diet and have been definitely less fit when it was increased. In these latter it is remarkable how nearly normal they have remained both in growth and activity.

The relative proportions of protein, fat, and carbohydrate in the diet is a subject upon which different views are held. At one end of the scale the ratio of ketogenic and antiketogenic substances is determined[17] by the formula $F = 2C + \frac{1}{2}P$. The advent of insulin however made it at once possible to give a more liberal allowance of carbohydrate. Of recent years good results have been obtained with a far higher proportion than had previously been thought possible. Rabinowitch[18] showed that in a series of cases a diet such as C. 50, P. 50, F. 150 (1750 calories) could be changed to one of C. 236, P. 73, F. 56 (1736 calories). In seven out of ten cases the change made a reduction of insulin possible. Short,[19] Poulton,[20] and others have also used diets of this type and for the comparatively short period for which they have been tried have found them satisfactory. The diabetic is able to tolerate these larger amounts of carbohydrate probably because of their stimulating action on the secretion of insulin by the remaining healthy islet tissue. Macleod[21] has shown that in healthy human subjects a greater fall of blood-sugar follows small doses of insulin plus glucose than follows the same amount of insulin alone. How exactly this is brought about is not yet quite clear, but from the evidence afforded by cross-circulation experiments he considers that the secretory activity of the islet tissue is under the control of the vagus centre and that this is stimulated by an increased concentration of glucose in the blood.

In most of the cases recorded above the carbohydrate has been increased during the last three years in amounts varying between 30 and 60 g. and in some there has also been a reduction in fat. The results have been generally satisfactory, particularly in that the patients have felt fitter and have been less liable to mild attacks of hypoglycæmia. To attain this increase no corresponding increase in insulin has been necessary in the less severe cases. In the very severe cases of long duration (such as Cases 2, 4, 5, and 6) it has not been found possible to increase the carbohydrate above 110 g. In the milder cases the diet can be varied considerably on the same dose of insulin without any corresponding change being observed in the blood-sugar readings or urine analyses.

In practice no hard-and-fast rule has been followed either as to the total calories given or the relative proportions of the different elements. The figures given by Lawrence for total caloric requirements have been used as a rough guide only, being modified according to the requirements and progress of the individual. The amount of carbohydrate has been varied according to the severity of the case, the stability of the blood and urine findings, the liability to hypoglycæmia and the sense of well-being, activity, and growth of the patient. Broadly speaking, all these considerations are best met with a diet containing between 90 and 110 g. of carbohydrate in very severe cases and between 120 and 200 g. in less severe ones.

PROGRESS

The progress of the disease is very difficult to estimate and this is particularly so in children whose food requirements are constantly changing. Infections too are a very disturbing factor in estimating progress. A mild infection such as a slight cold or an infected tooth undoubtedly has a considerable effect on the efficiency of the remaining islet tissue. If standardisation of diet and insulin is carried out with such infection present or before the results of an infection have quite passed off there may be considerable apparent improvement when such effects do pass off.

Case 7 shows this early recovery very clearly.

On admission he was on the verge of coma. He had had symptoms of diabetes for a few weeks and had scalded his foot four days before admission. The scald was a slight one and did not appear to be septic, and there was no evidence of any other infection. His blood-sugar was 0·4. In the first 24 hours he received fluids containing 80 g. of glucose and 85 units of insulin. His progress is seen in Table I.

TABLE I.—*Treatment in Case 7*

Diet.—April 14th to 17th: Fluids; 60 g. glucose. April 18th to May 24th: C. 80, P. 60, F. 120.

Date in 1933.	Units insulin.	Urine (24 hr.). Sugar (no acetone).	Blood-sugar.	Date in 1933.	Units insulin.	Urine (24 hr.). Sugar (no acetone).	Blood-sugar.
April				April			
14	60	+	0·11	30–			
15	30	0	..	May			
16	36	+	..	2	30	T.	..
17	36	+	0·16	3	20	0	0·04
18	45	+	..	3–10	20	0	May 6 0·05
19	45	+	..				
20	40	+	0·08	11	20	0	(6 A.M.) 0·14 0·09
21–24	40	+	..				
25	40	+	0·13	13	20	0	0·08
27	40	+	(6 A.M.) 0·18	15	10	0	..
			(10 A.M.) 0·06	17	10	0	0·07
28	40	0	0·06	20	N.	0	0·08
29	40	0	0·06	24	N.	0	0·09

N. = none. T. = trace.

This patient was finally sent out on C. 200, P. 60, F. 80, and 20 units daily. On this his resting blood-sugar has remained below 0·1, and his 24-hourly specimen has not contained more than a slight trace of sugar.

This patient might have been standardised on a smaller amount of carbohydrate and no insulin, but he is probably safer on a larger diet and this dose of insulin if he develops any infection. The liability of children to sudden increased loss of tolerance when an infection develops makes treatment without insulin, even in mild cases, extremely risky, and it should never be attempted.

Case 8 is another example of early improvement.

In March 1931 this patient was admitted on the verge of coma and was standardised on C. 45, P. 45, and F. 90, and 15 and 10 units of insulin daily. At this time three very septic teeth were removed. During the next six months the insulin was steadily reduced on account of hypoglycæmic attacks and in August it was stopped entirely. In September he had a relapse and began to pass sugar again, and was readmitted in October with a blood-sugar of 0·26. He was discharged on a diet of C. 85, P. 60, F. 110, and 12 units of insulin twice a day, which during the next few months was reduced to 11 units b.d. In May 1933 the diet was again increased to C. 160, P. 72, F. 120, and no further increase of insulin was found to be necessary, the urine remaining sugar-free, and on nearly all occasions the blood-sugar within normal limits. In this case the great recovery during the first six months of treatment was probably partly due to the beneficial effects of insulin and partly to the removal of focal sepsis.

If every infection could be treated under hospital conditions its effects might be less, but unfortunately in this series this has often not been possible. The following are examples of the progress of the disease:—

Case 12.—Three weeks after the first symptoms appeared the resting blood-sugar was 0·26 per cent. (For further details, see case notes.) She was then standardised on a diet of carbohydrate 85, protein 45, and fat 90, and six units of insulin twice a day. During the next 18 months the resting blood-sugar varied between 0·04 and 0·12 (one reading of 0·18 per cent.). The 24-hourly specimen was generally sugar-free, but occasionally showed a trace of sugar. To maintain the blood-sugar at this level the insulin had to be increased gradually to 10 units twice a day. At the end of this period she developed a severe cold with bronchitis, and for a short time had a high blood-sugar, glycosuria, and severe ketosis. At the age of 5 she was readmitted and restandardised on a diet of C. 90, P. 50, and F. 45 (on account of ketosis), and 24 units of insulin daily. This child is now 7 and, although the diet has been increased to C. 110, P. 60, and F. 120, she still only needs the same dose of insulin to keep the blood-sugar between 0·03 and 0·09 per cent. Her progress may be tabulated as follows:—

	Diet.	Insulin.	Weight.
Age 3.	C. 85, P. 45, F. 90, Cal. 1400	6 b.d.–10 b.d.	.. 1 st. 11 lb.
„ 4½.	Infection with severe relapse of diabetes.		
„ 5.	C. 90, P. 50, F. 45, Cal. 965	12 b.d.	.. 2 st. 9 lb.
„ 7.	C. 110, P. 60, F. 120, Cal. 1800	12 b.d.	.. 3 st. 5 lb.

Case 9, after she had been treated for 18 months, was standardised at the age of 9 on C. 90, P. 56, F. 105, Cal. 1575, and 25 and 20 units of insulin daily. Weight 4 st. At the age of 11 she was taking C. 102, P. 60, F. 105, Cal. 1640, and 20 units of insulin twice a day. Weight 5 st. 3 lb.

Progress may be summarised as follows. The onset of symptoms is acute over a period of a few days or weeks. Sometimes the parents think they can state accurately the day on which the symptoms began. How long the disease may be latent before symptoms appear it is difficult to say. Within a few days or weeks of the onset of symptoms there is a great degree of impaired sugar tolerance and ketosis, which is often made very much greater by the development of an infection. If the disease is then controlled with diet and insulin there is considerable improvement of carbohydrate tolerance, and if there happens to be an infection present and this subsides or a septic focus is removed there is even more improvement. This improvement is particularly marked if treatment is begun soon after the onset. After one or two years of insulin treatment, although it is often possible to increase the diet with growth and increase the amount of carbohydrate given without increasing the insulin, there does not seem to be recovery in any of these cases to the extent that insulin can be stopped or even reduced very much. On the other hand, the occurrence of further infections or of failure to control the disease with insulin usually leads to further permanent loss of tolerance.

INFLUENCE OF INFECTIONS

The severe effects of acute or chronic infection in the course of the disease are well known, and their frequency in childhood makes management more difficult than in the adult. In the present series this has been shown again and again. Every severe exacerbation in an established diabetic was associated with some infection, and the rise in blood- and urine-sugar and ketosis with even a slight cold is remarkable. This effect is well shown by Case 13 who, while in hospital, developed an acute bronchitis of moderate severity (see Figure) and by Case 16.

An acute infection is nearly always the cause of diabetic coma. The risk, however, of coma developing in a diabetic child is comparatively slight, provided that the dose of insulin is not reduced. Chronic infections as in adults also have a bad effect on the disease and it is of the utmost importance that, if these are present, they should be dealt with early in treatment. It should be remembered that the effect of infection probably persists for some considerable time after it has apparently subsided or a focus has been eradicated, and allowance made for this during standardisation.

BLOOD-SUGAR DURING TREATMENT

An increased amount of glucose in the blood is a stimulus to the secretion of insulin, and in order that what remains of normal islet tissue may not be over-stimulated the blood-sugar should be kept within normal limits all the time. In children this ideal is difficult to achieve, particularly if the doses of insulin are limited to two daily, because the blood-sugar level is controlled by so many variable factors. These are chiefly activity and infections. There is also the variation in strength of different samples of insulin and apart from gross diet delinquences, the slighter variations which must inevitably occur, at any rate in out-patients of this class. Even when children are under strict supervision in hospital there is often an unaccountable variation in the blood-sugar, and this is usually most marked in children during the early months of insulin treatment. In the more severe cases it is difficult to prevent a rise of blood-sugar in the early hours of the morning before the first dose of insulin is given.

Blood-sugars of out-patients are taken between two and three hours after breakfast, and in most this reading can be kept within the limits of normal (0·06–0·12). Apart from the incidence of infections many children remain steady year after year. In others the story is very different, and to steer a course between hypoglycæmic attacks on the one hand, and readings of 0·2 per cent. on the other, seems impossible. This cannot be entirely attributed to carelessness over diet and insulin for it occurs with patients in hospital under strict supervision. Case 13, after being an in-patient on a constant diet and insulin dosage for three weeks, had the following blood-sugar readings on six successive days, two hours after breakfast: 0·04, 0·05, 0·22, 0·15, 0·25, and 0·07. In some patients in whom control is difficult the choice lies between a very strict régime with rather curtailed activities and a normal blood-sugar and no glycosuria; and a normal life with a fuller diet, a raised blood-sugar, and frequent glycosuria. In such a case, I think the latter course is preferable. Patients often feel and appear very much better on a freer diet, even though it means occasional glycosuria and a raised blood-sugar. The risk is that the effects of a raised blood-sugar on such processes as arterio-sclerosis and cataract are not yet known.

GLYCOSURIA DURING TREATMENT

In these patients the aim has been to keep the 24-hourly specimen completely free from sugar. This ideal has rarely been attained. Many patients pass only an occasional slight trace of sugar and remain sugar-free for long periods, in others the urine frequently contains small amounts of sugar. The latter are usually sugar-free after the first dose of insulin in the morning until late at night or early in the following morning when the pre-insulin rise in the blood-sugar occurs. A few cases are still more difficult and at times pass considerable amounts of sugar at other periods of the day. Here again, if they feel perfectly well and are able to live a normal life as is usually the case, a more limited diet and a stricter régime are avoided.

HYPOGLYCÆMIA

Wauchope[22] says: "The point at which hypoglycæmia begins is even more difficult to determine than the normal level; it is indeed not a point but an elastic zone." She suggests the following figures for adults: normal fasting blood-sugar 0·1, symptoms of hypoglycæmia at about 0·08, these become severe at 0·05 and death may occur in the neighbourhood of 0·025. The figures are probably lower in children. Harrison[23] estimated the blood-sugar in a number of children under 12 years of age, and in 11 of these it was below 0·05 on 28 occasions without symptoms, and the lowest value was 0·028. In this series none of the cases was actually observed in coma. Readings of 0·04 were, however, often seen in children with no symptoms, the lowest without symptoms being 0·035. The early symptoms in children are very likely to be missed, for even adults find them very difficult to describe. Wauchope says that children often become pale and tearful, often they are merely naughty or perverse. They may fly into a sudden rage, scream and kick, and refuse obstinately whatever is suggested. They are more prone to develop convulsions than adults. The actual coma is liable to be mistaken for natural sleep. In these, the early symptoms were usually very indefinite and included such complaints as irritability, inexplicable crying, pallor, flushing, hunger, and perspiration. Diagnosis usually depended on the time of onset in relation to the dose of insulin and a careful history as to food and exercise. In the more severe attacks coma usually developed without much warning. Convulsions occurred five times in nine cases of coma. There were no fatal cases, in spite of the fact that in most, medical aid was not available at the time and no treatment was given until the patient began to come round, in some cases after two or three hours, and could take sugar by the mouth. Very few fatal cases in children appear to have been recorded.

Hypoglycæmia occurred most commonly during the first year of insulin treatment and usually resulted from a patient being discharged on too high a dose of insulin. The causes of this in these patients appeared to be three: failure to allow for the effects of exercise; too rapid standardisation and failure to allow for the initial improvement in carbohydrate tolerance; and failure to allow for the improvement of carbohydrate tolerance following the removal of a septic focus.

Lawrence[24] has shown the effects of exercise in lowering the blood-sugar. If too little exercise is given in hospital during the later stages of treatment, when the child goes home and resumes a normal life the dose of insulin is too high, the blood-sugar is lowered, and the carbohydrate reserves are depleted. If standardisation is carried out too rapidly there may be considerable recovery in tolerance after discharge from hospital so that the dose of insulin becomes too high and hypoglycæmia develops suddenly before this is realised. If standardisation is carried out after the removal of some septic focus or while the effects of some latent infection are still present, the patient requires a much larger dose of insulin than is the case later when these effects have passed off, with the result that hypoglycæmic coma develops some weeks after discharge.

The condition can in most cases be avoided if the patient is watched carefully, particularly during the first few months after discharge, but when patients are only able to attend hospital at intervals of a month or two months adjustments of insulin dosage are not always carried out. Other cases are due to carelessness, such as the omission of a meal after insulin or an overdose.

Great instability of the blood-sugar readings occasionally occurs and has already been mentioned. When this is present hypoglycæmic attacks may be troublesome. Brucke [25] describes a child of 8 who had seven severe hypoglycæmic attacks in less than a month although diet and insulin were under strict supervision, and Heimann-Trosien and Hirsch-Kauffmann [26] another in which extreme variations in the blood-sugar readings occurred with no clear explanation. Wauchope emphasises that after manifestations of hypoglycæmia, however slight, insulin should be discontinued or reduced and guarded by abundant carbohydrate until the balance is re-established; she considers that the last course is probably the best because it promotes replenishment of glycogen stores.

DIABETIC COMA

In this series diabetic coma occurred six times in four patients. Two of these were cases of acute coma in which the diagnosis of diabetes had not previously been made and no treatment had been given. One of these was fatal. In four cases coma occurred as a result of infections during the course of the disease, and in three of these it was caused by the usual dose of insulin being stopped because the child was ill. One of these died in coma. In the fourth, the patient developed an acute empyema of antrum, and, although the usual dose of insulin (20 units b.d.) was continued, coma developed. Recovery was rapid with a small extra dose of insulin. Both the cases who died were in extremis when they were admitted to hospital with prolonged coma and dehydration. They had neither been given any insulin for the coma.

Apart from the two cases of initial coma only one occurred in this series, which covers 60 diabetic years, which might not have been prevented by continuation of the usual dose of insulin. The case in which insulin had been continued proved extremely easy to treat.

Of the treatment of a diabetic child during an infection Joslin [15] says :—

> "Do not omit insulin but rather give it more frequently adjusting the dose to keep the urine sugar free or nearly so. Presumably it will be necessary to increase the insulin one-half or even to double it, but if it is given at six- or four-hourly intervals there is little danger of an insulin reaction. With care a diabetic child will pass through any sort of infection which a normal child will withstand."

Unfortunately, fear of hypoglycæmia is still one of the causes of coma. The danger of the former during an infection is, however, slight, and in cases of real doubt can be made still less by giving fluids containing plenty of glucose. The Figure shows clearly the way in which the blood-sugar rises during an infection, even though the amount of carbohydrate given is diminished and the dose of insulin increased. This child was extremely sensitive to infections and eventually died in coma when insulin was stopped during a cold.

GROWTH ACTIVITY AND SEXUAL DEVELOPMENT

An important test of the efficiency of treatment is the *growth* and development. Table II. shows the present height and weight of the 16 surviving patients here described :—

TABLE II.—*Showing Height and Weight of 16 Surviving Patients*

Case	Sex.	Duration of diabetes in years.	Age now.	Weight* now.		Average for age.		Height* now.		Average for age.	
				st.	lb.	st.	lb.	ft.	in.	ft.	in.
1	F.	8	15	6	6	7	8	5	1	5	1
2	M.	8	21	11	10	..		5	11½	..	
3	M.	1½	14½	6	4	6	13	4	10	5	0¾
4	M.	6	13½	6	6	6	3½	4	8	4	10
5	F.	2	16½	8	6	8	3	5	2	5	2
6	F.	5	17	9	2	8	3½	5	1	5	2½
7	M.	½	10½	4	11	5	0	4	6½	4	4¾
8	M.	3	9½	4	0	4	8	4	2	4	2¾
9	F.	3½	11	5	3	4	12	4	4½	4	5
10	F.	7	18	6	11	8	9	5	2½	5	2½
11†	M.	6	15½	4	9	7	13	4	6½	5	3½
12	F.	3½	7	3	5	3	5½	3	8	3	8
15	F.	7	21	9	8	..		5	6½	..	
16	M.	1½	15	7	10	7	4¾	5	2	5	2½
17	M.	1½	13½	8	0	6	3½	5	0½	4	10½
18	M.	½	9½	5	0	4	8	4	8	4	4¾

* Without shoes, with clothes.
† Congenital heart disease.

Case 11 is grossly undergrown, but he has severe congenital heart disease. Cases 7 and 18 have only had diabetes for six months. Of the remaining 13 cases, five are underweight, one is of average weight, and seven are overweight. Two are over average height, five are of average height, three are 1 in. or less under the average, and three are 2¾ in., 2 in., and 1½ in. under the average respectively. The physique of all except Case 11 compares very favourably with that of other children of the same age and class. None of the patients have the puffy myxœdematous appearance seen in patients taking insulin.

Activity.—The activity of these patients is not restricted in any way. Those who are still of school age attend regularly and do not appear to catch more infections than normal children. In intelligence they seem to be rather above the average. Case 4, who is now 13 and one of the worst diabetics in the series, and has had the disease since he was 7, has played all games, including football and swimming for several years, is top of his class, and sings in a college choir.

Sexual development.—(Males). Case 2, aged 21, has had very severe diabetes for eight years and is quite normal in development and function. The five other males between 13 and 16 appear to be developing normally. (Females). The five females between 15 and 21 have all developed normally. Three of these aged 15, 17, and 18, who have had diabetes for 8, 5, and 7 years have never had any

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menstrual periods. Case 15, who is now 21, and has had the disease for seven years, had no periods until she was 20, and has had three since. Case 5 started normal periods at the age of 14 and these ceased when she developed diabetes at 14½. After six months' insulin treatment they returned and have continued irregularly since but getting more regular.

Joslin [15] states: "The normal sexual development of a diabetic child at puberty may soon be considered as an index of good or bad treatment." In considering the above results however it should be remembered that in those cases with a longer duration than five years insulin treatment was often insufficient to control the disease and the diet was often very restricted.

In conclusion, I should like to thank Dr. C. E. G. Wolf and the staff of the biochemical laboratory at Addenbrooke's for their investigations, Dr. G. S. Haynes. Dr. J. F. Gaskell, and Dr. C. H. Whittle for sending me cases, and Miss J. I. Mills for help in arranging diets.

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PLEURO-PULMONARY PERFORATIONS

THE USE OF GAS ANALYSIS IN THEIR DIAGNOSIS*

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The methods ordinarily employed in the diagnosis of the presence of a communication between the pleural space and the lung may be summarised as follows:—

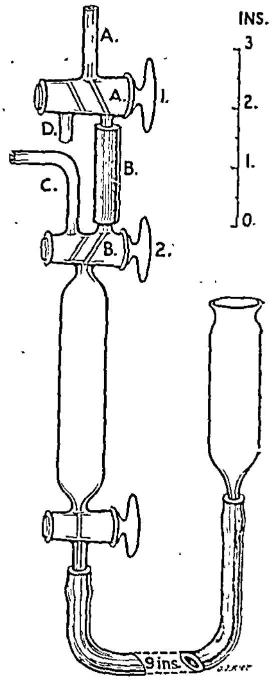
1. *Clinical.*—If a patient known to have an empyema suddenly coughs up a large amount of pus, or if a complete spontaneous pneumothorax develops, the presence of a pleuro-pulmonary perforation is obvious. Other suggestive points are maintenance of a pneumothorax in spite of deflation, amphoric breathing over a pneumothorax cavity in some cases, and the lung fistula sound. Inversion of a patient may reveal by clinical signs a fistula previously sealed by fluid.
2. The injection into the pleural space of dyes and volatile substances may by their subsequent detection in the sputum reveal the presence of a fistula.
3. Pleural pressure studies such as the test of Bard and of Dumarest.
4. X ray of the chest in inspiration and expiration may suggest a fistula by the behaviour of the mediastinum and collapsed lung.
5. A fistula may be visualised by thoracoscopy.

In addition to these methods it is possible to detect a pleuro-pulmonary perforation by gas analysis, and the purpose of this paper is briefly to describe this method.

Since the original observations of Davy [1] in 1823, numerous records have been made of the composition of the gas in the pneumothorax cavity. So far this method has been used in the study of special cases only. It can however be used as a routine procedure, and the air in the pleural space can be examined with the same ease as a pleural effusion. A sample of gas is taken from the pneumothorax cavity into a sampling tube by displacement of mercury and its oxygen and carbon dioxide content determined.

APPARATUS AND TECHNIQUE

Any apparatus is suitable which is capable of analysing a sample of gas of about 10 c.cm. volume and in which the CO_2 and O_2 together are not more than about 25 per cent. Accuracy to two places of decimals is not necessary, since only large and definite variations of oxygen and carbon dioxide are clinically significant. Small and portable machines are liable to imperfections and leaks which invalidate the method, and it is easier and better to carry the sample to the machine than the machine to the patient. A good sampling tube is essential, and the model here illustrated was made so that a sample could be obtained at about atmospheric pressure and transferred to the gas analysis apparatus without any possibility of leakage.



It has a capacity of 25 to 30 c.cm. and obviates the necessity of a special tube for washing out the connexions. A sample is taken through A and B by lowering the levelling bulb. This contaminated sample is expelled through C, having closed tap 1 and turned tap 2 so as to connect the sample tube and C. Another sample is then taken. The outlet D is to enable the mercury from the apparatus to fill the tubing as far as tap 1 before the specimen is expelled for analysis.

Most phthisiologists now use atmospheric air in the pneumothorax cavity, but it is known that no matter which of the gases hitherto used is introduced into the pleural space, the resulting mixture has a fairly definite composition, provided that the gas has no irritant effect on the pleura. When air is introduced into the pleural cavity, CO_2 diffuses into it from the capillary blood more rapidly than oxygen passes from the pleura into the blood; this causes a temporary increase in the volume of the pneumothorax first noted by Dautrebande and Spehl.[2] However, in a matter of hours equilibrium is established. The actual composition of the pleural gas will be changed by variations in degree of collapse of the lung, by histological changes in the pleura, and by the presence of pleural effusion.

In order to provide a background on which these results can be judged, the gas content of the pneumothorax cavity has been examined in 150 cases, and from this series the following conclusions can be drawn:—

Whereas the atmospheric air contains about 21 per cent. oxygen and practically no CO_2 (0·03 per cent.)

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the air of a dry pneumothorax cavity contains roughly between 1 and 5 per cent. of oxygen and between 6 and 8 per cent. of CO_2.

When inflammatory fluid or exudate is present the oxygen content is low and may be below 1 per cent., and the CO_2 is high and usually over 10 per cent.

In the present series of cases without fistula the oxygen content of 60 dry cases varied from 0·9 per cent. to 4·56 per cent., and the CO_2 content from 5·85 per cent. to 10 per cent.

In 90 cases with definite fluid present the oxygen content varied from 0·4 per cent. to 4·31 per cent., and the CO_2 from 9·84 per cent. to 14·7 per cent.

As long ago as 1876 C. A. Ewald showed that the air in open pneumothorax contained 16·75 per cent. oxygen, which fell to 2·6 per cent. when the fistula closed, but no detailed studies were made. In many cases the sum of the evidence may show very definitely that the fistula is open, but in others it may be difficult of proof.

ILLUSTRATIVE CASES

In ten cases analysis of the pleural gases was of value in demonstrating the presence and state of a pleuro-pulmonary perforation. The following are details of three of these cases:—

(1) A. B., male aged 50.

Had extensive bilateral pulmonary tuberculosis when first seen. Sputum was Gaffky 10 and fluid in the right chest contained tubercle bacilli. He was considered unfit for artificial pneumothorax, but he developed a spontaneous pneumothorax in the left side and was deflated many times.

Gas analysis showed oxygen 1·14 per cent. and CO_2 12·2 per cent., and four days later oxygen 2·5 per cent., CO_2 11·5 per cent. Three days later 2000 c.cm. of fluid were removed, and by shifting the patient samples of gas were obtained at intervals during the removal of the fluid. These showed—

O_2 ..	2·0 per cent.	CO_2 ..	11·3 per cent.
O_2 ..	2·12 ,,	CO_2 ..	13·18 ,,
O_2 ..	2·16 ,,	CO_2 ..	13·20 ,,

At this point the patient developed sudden dyspnœa and pain in the chest. Amphoric breathing and bubbling sounds were heard at the left base. Gas analysis showed oxygen 10·21 per cent., carbon dioxide 9·85 per cent., indicating that air had entered the pleural space from the lung.

At autopsy a pyopneumothorax with a bronchial fistula was found.

(2) C. D., male aged 26.

Had a spontaneous pneumothorax on the right side two weeks before admission. Gas analysis showed—

O_2 ..	3·8 per cent.	CO_2 ..	8·2 per cent.
O_2 ..	2·1 ,,	CO_2 ..	8·7 ,,
O_2 ..	1·2 ,,	CO_2 ..	11·3 ,,

When fluid developed analysis showed O_2 0·9 per cent., CO_2 12·6 per cent. Later he developed rise of temperature, dyspnœa, cyanosis. Gas analysis showed O_2 8·5 per cent., CO_2 11·7 per cent., indicating that a pleuro-pulmonary fistula had opened. The coughing up of gomenol in oil previously put into the pleural space confirmed this.

(3) E. F., male aged 18.

Had initial pneumothorax on the left side five months after the onset of illness. Five weeks later fluid developed which subsequently showed tubercle bacilli. Gomenol in oil was injected as a disinfection oleothorax and was coughed up. An X ray photograph showed the gomenol to have disappeared. Methylene-blue was also coughed up. Two gas analyses showed—

O_2 ..	8·52 per cent.	CO_2 ..	9·60 per cent.
O_2 ..	7·61 ,,	CO_2 ..	9·75 ,,

indicating a broncho-pleural fistula.

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PERCENTAGE OF FAT IN HUMAN MILK

INFLUENCE OF THE METHOD OF EXTRACTION

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Clinicians interested in infant feeding are continually brought in contact with the problem of fat absorption, and except for the generally accepted fact that the strippings of a breast or udder contain more fat than the milk of the earlier part of the feed, it has been usually assumed (see Truby King manual) that the percentage of fat in human milk remains roughly at an average of 3·5.

In a recent paper in the *Biochemical Journal*[1] the authors reported results obtained in an investigation of the fat percentage. Previous work[2] on the percentage composition of early milk had suggested that the method of extraction exerted considerable influence on the percentage of the fat although that of the other constituents was not affected. There has always been a considerable variation in the fat percentage of human milk recorded by different investigators, without any reasonable grounds for this variation being suggested. We may summarise the facts already put forward.

With regard to the factors which influence the percentage of fat in milk, these are method of extraction, period of lactation, individual variation, and the volume of the milk in the breast at the time of taking the sample; all of which were taken into account when considering the effect of the method of extraction.

In the normal action of the baby feeding two mechanical factors are concerned, pressure and suction. Direct pressure exerted by the gums of the baby upon the nipple and areola of the breast, and suction action exercised by tongue and cheek drawing on the openings at the end of the nipple. Digital expression and gentle suction from a breast pump, used without pressure on the breast, seem to give the nearest approach which can be made artificially to reproduction of these two factors of the normal process, and were the methods of extraction employed by us. As a result of systematic comparisons made by these two methods (details of which were given in the *Biochemical Journal*[1]) it was shown that pressure is the most important factor in producing a high percentage. The greater the pressure the steeper the rise in the fat percentage. Suction alone tended to lower the percentage.

It is a well-known fact that the percentage of fat in samples taken at the end of a feed is normally higher than that in the milk taken from the breast at the beginning of the feed. Yet it was possible, by using digital expression to extract the milk at the beginning of the feed, then allowing the baby to feed for three minutes and using the breast pump to extract the end milk, so as to show that not only was this difference annulled, but that the percentage of fat in the end specimen in some cases was actually lower than that in the one taken before the feed. After investigating the milk of 51 mothers and analysing 294 specimens, the conclusion we drew was the following: that in any given sample of milk, other factors being equal, the percentage of fat present will depend inversely on the *quantity of milk in the breast* at the time of taking the sample, and directly upon the degree of pressure exerted upon the areola and nipple in the process of extraction. The practical use to which the above facts have led has been in the treatment of certain clinical difficulties occurring in connexion with breast-fed infants.

It is generally agreed that of all the ingredients of milk, fat is the most difficult for the infant to digest. Czerny and Keller[3] state that only few children can tolerate high fat percentage in their feeds. The majority of infants who are fed for a long period on high fat milk mixtures become pale and ultimately more or less anæmic. These observers also state their experience that infants on high fat rations suffer from vomiting, and that the vomiting fails to respond to therapeutic measures, and only yields to an alteration in the diet. In Prof. Findlay's wards at the Royal Hospital for Sick Children, Glasgow, "fat dyspepsia" was recognised as a definite clinical entity. This diagnosis was made because the vomiting and failure to put on weight, for which the infants were admitted to hospital, were completely relieved by the substitution of skimmed milk mixtures for the whole milk which the infants had previously been taking.

Brennerman[4] states that: "The amount of fat in cow's milk has a decided effect on coagulation, but even more so on the emptying time of the stomach. Fat-free milk coagulates more quickly and completely than does whole milk, and forms a harder, whiter curd. The richer the milk in fat, the slower and less sharply defined is the separation into curds and whey, the yellower and smaller and softer the curd, but the harder to digest and the slower to leave the stomach." Because of this effect of fat in forming smaller and softer curds, Macy[5] erroneously attributes to Brennerman the statement that fat aids the digestion of protein. Some dried milk manufacturers have put a half-cream milk powder upon the market.

While high fat percentages undoubtedly interfere with digestion, it is important not to overlook the value of an adequate supply in the feeds of weak and undernourished babies. This has been specially emphasised by Koeppe,[6] who has observed improved growth and development in some weakly infants suffering from malnutrition, when they have been allowed to secure the last portion of the milk from the mammary gland. Our observations on the fat percentages obtained in milk samples by different methods of extraction show that the percentage of fat ingested even from the same breast by different infants will vary considerably, a baby who is a vigorous sucker being able to obtain a higher proportion of fat than the child who is a poor sucker. Macy and her collaborators state that Dr. Emmet C. Troxell, as a dermatologist, has observed that in some vigorous, hardy, breast-fed infants a certain type of eczema develops that clears up by shortening the nursing period and by allowing the infant to feed from both breasts, and thus preventing the baby from obtaining the strippings.

In the Infant Welfare Department of the Royal Free Hospital, in coöperation with Dr. Hazel Chodak Gregory, clinical observations were made along the lines suggested by the findings in our paper in the *Biochemical Journal*,[1] and, as a result of this work, it became possible to put the babies observed into two groups.

Type 1.—A small active baby showing dyspeptic symptoms such as vomiting and green stools. Careful inquiry and observation elicits the facts that the baby is a very vigorous sucker and that the mother's *milk yield is not plentiful*. This baby is getting a milk containing a very big percentage of fat, probably the highest fat percentage possible for this woman. As the quantity of fluid ingested is small, the total *fat will be proportionately large*. This condition, once recognised, we have found, can be rectified by an understanding of the situation and an alteration of conditions. The aim to be achieved is an increase of *total fluid resulting in a proportionate diminution of fat, combined with an absolute reduction in fat intake*. We have found that the first can be achieved by administering boiled water before and during the feed, the second by *ensuring that the infant does not get the strippings of the milk*. This can be secured by putting the baby to both breasts at each feed and not allowing the strippings to be taken from either. Manual stripping afterwards maintains the milk supply.

Type 2 is the exact antithesis of Type 1. Here the baby weighs above the average at birth, is contented and sleepy, and yet fails as time goes on to increase satisfactorily in weight, and this in spite of ingesting apparently adequate quantities of milk, a point which can be verified by test weighing. In many cases of this type studied, there was present an abundant supply of milk, but the musculature of the nipples was so lax that the milk tended to spurt from either breast before feeding. The baby is therefore in the position of taking dripped milk, which will be the lowest possible in fat for that mother (see *Biochem. Jour.*[1]).

As has been shown,[2] no effect is produced by the method of extraction upon the sugar content. Dripped milk will therefore contain a normally high sugar content. The second type of child is therefore obtaining a milk ample in quantity, normal in sugar, but deficient in fat, due to the fact that the baby does not suck, and the total feed therefore is practically that of dripped milk. We have found this condition to be corrected, first by lengthening the intervals of feeding, so as to allow the infant to get hungry and thus encourage *increased pressure and cause a rise in the percentage* of fat intake. Secondly by withdrawing some of the fore milk, and thus ensuring that what milk the infant can be induced to suck should contain a large *quantity of strippings*. By these procedures both conditions can be rectified without taking the baby off the breast.

It is possible that the facts that have been recorded *above may be of assistance to clinical officers* in coping with certain of the difficulties that arise in maintaining successful breast feeding.

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HOSPITAL WAITING-LISTS.—It was stated at a recent meeting of the Swansea Hospital Board that the waiting-list has increased from 64 last year to 1149. The contributory scheme has now been joined by 955 firms and 85,000 employees belonging to them, and 25,000 unattached contributors.—The Fleming Memorial Hospital for Sick Children, Newcastle-on-Tyne, is stated to have a waiting-list of some hundreds. It has been swollen by a decrease in the number of beds "owing to the lack of space and modern sanitary arrangements."

CLINICAL AND LABORATORY NOTES

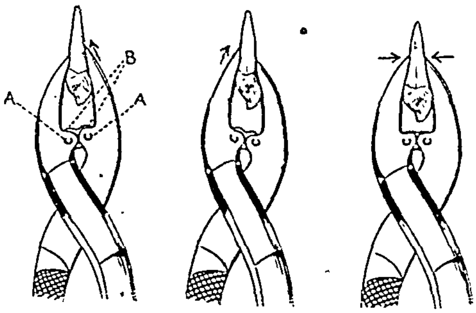
A NEW DUAL-ACTION PRINCIPLE IN TOOTH-EXTRACTION FORCEPS

By D. M. Shaw, L.D.S. R.C.S. Eng.

This note describes a new type of dental forceps and also reports opinion on the results of some first trials of the instrument in the extraction of over 300 teeth, as many as possible of which were selected as being likely to prove "stiff" or firmly planted units. Most of the extractions were done in private practice; some were at dental hospital clinics and in the dental department of a general hospital.

The Levatorceps, as it is called, differs from all ordinary forceps in that each blade or beak can, in a simple and effective manner, be independently thrust and advanced along the surface of the root for a short and safely controlled distance, the directional control at each forward thrust being made more complete by the maintained engagement of the opposing (and then stationary) beak. And thus, by the alternate and successive advance of each blade, the penetration of both blades to any desired depth is mechanically facilitated. The rootward penetration is in this way effected with only about half the manual thrusting effort required for that simultaneous advance of both beaks to which ordinary forceps are restricted. During the alternating advance of the thrusting beak through a short (2 to 4 mm.) and nearly flat arc, the fit and alignment of the other—the opposing and then less active—beak does not tend to be wrongly disturbed; with ordinary forceps the latter kind of faux pas is the not very uncommon result of the attempt to secure the wished-for advantage—of some degree of alternating single-beak penetration—by the makeshift of a rocking or swinging movement of the whole forceps. And further, the reasonable expectation that the gradual single-blade penetration might involve rather less bruising or crushing of the investing tissues appears to be supported by close observation of the levatorceps in action, as well as of the post-extraction condition.

FIGS. 1 2 3



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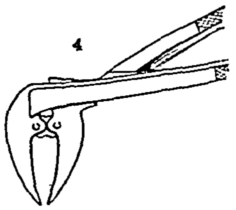

FIG. 1 shows the new principle of pivoting the main members solely on the twin axes A, A, which axes are situated at each end of a short link or shackle bar B, the latter having a restrained range of movement in the same plane as that of the opening and closing movements of the instrument. To save space, Fig. 1 also indicates the advance of one blade along the root surface.

FIG. 2 shows the advance, in succession, of the opposite blade.

FIG. 3 shows the "penetration" arrived at after a few alternating (and relatively moderate) thrusts in succession.

FIG. 4 shows a "hawk's-bill" forceps for lower teeth.

Although the levatorceps may fairly be said to combine in one instrument, and to a proved serviceable extent, the distinct and hitherto immiscible utilities of the elevator and the forceps, no absurd suggestion is here implied that the new instrument could take over or perform any of those operations in which the unique and invaluable services of the elevator proper are specially called for. In addition to the above-noted primary feature of the levatorceps, the more forward placing of each axis or fulcrum (*in front* of the usual and necessary "crossing" of the main members) provides, as the accompanying illustrations make sufficiently evident, a much greater leverage (mechanical advantage) and better non-slipping grasp of the root; and again with marked economy of manual gripping effort. In effect, and in surprising degree, there was experienced a welcome reduction in that muscular strain and fatigue from sustained gripping effort which sometimes, in stubborn extractions, compels the prudent operator to desist and take one or more rests. In the levatorceps, as in many types of ordinary forceps, the diagonal "crossing" is boxed in, thus affording an added security against undesired looseness in the more forward and real axes of movement.

The impression given by the 300 extractions with the levatorceps was that the teeth were dislocated and removed with decidedly increased ease, as compared with like extractions with ordinary forceps. The very firmly planted teeth, in particular, were extracted with an expedition and a minimum of strain that proved very satisfactory to patient and operator. In a few chance instances, in each of which a very "stiff" tooth did not even begin to dislocate during patient attempts with ordinary forceps, a change-over to the levatorceps quickly resulted in a successful whole-tooth extraction. The new instrument proved serviceable also in extractions of displaced and incompletely erupted teeth removed for the regulation of crowded dentitions.

Any desired shape or size of beak or of handles may be incorporated in the levatorceps. Moreover, the alternating single-blade method of penetration is quite optional—that is, there is nothing to hinder the operator from using it, at will and at any operative stage, by the simultaneous advance of both beaks, just as with ordinary forceps. This latter choice of a variable technique has indeed in some cases been advantageously applied during multiple extractions, wherein some of the teeth were stiff and some were easy propositions.

One of the arguments stressed by proponents of the open or "surgical" removal of teeth pointed earnestly to the lamentably large proportion of broken teeth and roots, unremoved root remnants and sequelæ associated with extraction and attempted extraction by forceps. They urged that that long trail of trouble would be reduced to about vanishing point if and when the advised surgical method came to be widely adopted. However that may or may not be, no one can safely assert that the limits of perfection or usefulness in forceps design have already been attained. The number of teeth relegated to treatment by forceps in this country alone amounts to several millions in each year. And so the advent of a new type of instrument by which adequate penetration along the socket is made surer and easier, and a stronger non-slipping grasp obtained with relatively less effort, is perhaps of sufficient general interest to merit further attention and trial.

SECRET COMMUNICATIONS MADE VISIBLE

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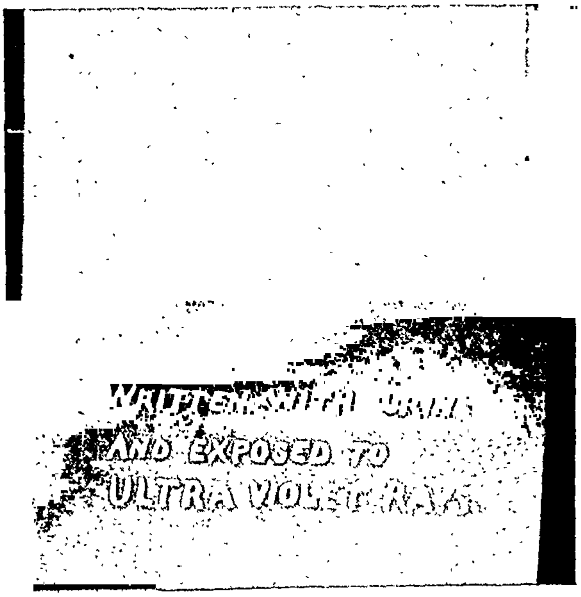
ULTRA-VIOLET radiation has come to be recognised as a force both valuable and versatile in its application. Criminologists have found filtered ultra-violet light a valued assistant in many spheres of their work. Existing literature provides ample evidence of the many possible applications of the filtered ultra-violet ray. Investigations with these rays can be carried out expeditiously, and are simple in execution. Moreover, the test as applied by the analytic quartz lamp has the valuable advantage that the object under examination is in no way damaged, marked, or altered. As has been pointed out by Rubner,[1] and also by Goodman,[2] correspondence to and from prisoners can be examined in a few seconds by exposure to filtered ultra-violet light, since the substances commonly used by prisoners for secret writing—e.g., urine, saliva, milk, all show fluorescence on such exposure.



Two photographs of a sheet of paper on which is a sentence written with urine. Above, by ordinary light. Below, by filtered ultra-violet light.

No evidence of the exposure is left on the communication and this method of rendering the invisible visible is far in advance of the usual method of heating. Where heat is used the writing turns black or brown. As a result the communication cannot be sent to its destination, because suspicion would be at once aroused. Under filtered ultra-violet light, however, such writing is read without altering the letter or communication in any way, since the rays leave no trace of any kind to warn the recipient, and thereby put him on his guard.

Such photographs form a permanent record of the invisible rendered visible, and may be produced in a court of law and submitted with striking effect to a jury.

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A NOTE ON THE VALUE OF THE DICK TEST FOR INSTITUTIONAL PURPOSES

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THE first evidence of an outbreak of scarlet fever in Stoke Park Colony (for mental defectives) occurred when two children simultaneously developed the disease. They were isolated at once, but both were school-children and it was found that the direct and indirect contacts among the patients numbered 389. It was decided that an attempt should be made to check the epidemic and to "Dick-test" all the contacts. The youngest children were tested first.

The method used was that generally employed—namely, the intradermic injection into the left forearm of 0·2 c.cm. of a dilution of the filtrate obtained from a broth culture of the *Streptococcus scarlatinæ*. Into the right forearm a similar injection was made of 0·2 c.cm. of the same toxin, boiled for two hours. The toxin and control were both obtained already diluted. Injections were given into both forearms simultaneously and great care was taken to ensure that the weal raised was of the same size on each forearm. After injection the patients were examined in twenty-four hours and again in forty-eight hours. It was occasionally necessary to make a third examination, especially in those cases in whom there was a definite reaction on both forearms. It was found that when the reaction on the left side was larger than that on the right a definite positive reaction subsequently developed.

All patients giving a positive reaction received 4 c.cm. of antiscarlatinal serum intramuscularly—the outer side of the thigh being used in all cases.

On the first day 58 patients were tested, of whom 23 gave positive reactions in twenty-four hours. Of these 23, 2 patients had developed scarlet fever at the time of examination. All were given serum and the cases of scarlet fever were isolated. Testing was continued each day and a list was kept of the name and age of each patient. Of the 389 patients tested 69 were Dick-positive and each received 4 c.cm. of antiscarlatinal serum. No fresh cases of scarlet fever occurred. Thirty-seven members of the staff were Dick-tested at the same time, of whom 10 gave a positive reaction. The same intramuscular injection of 4 c.cm. of antiscarlatinal serum was given in these cases. Of the 79 cases receiving "passive immunisation" only one, a member of the medical staff developed serum sickness.

Age-groups.	*Total patients.*	*Positive reactors.*	*Per cent. positive.*
5–10	49	21	42·8
10–15	79	17	21·5
15–20	96	14	14·6
20–25	49	5	10·2
25–30	42	1	2·4
30–35	42	4	9·5
35–40	22	6	27·2
40–45	10	1	10·0

The patients tested (exclusive of staff) were arranged in five-year groups as in the accompanying Table, and the percentage of positive reactors in each group calculated. The percentage of Dick-positive patients in each age-group shows a very regular fall down to the age of 30, which is significant of a regularly increasing immunity to the streptococcus. The apparent rise after the age of 30 is more difficult to interpret. Of the 1700 patients at present alive in this institution a recent analysis of their age-incidence shows that only 6 per cent. have reached the age of 35 or over. In the last 400 consecutive deaths in this institution 96 per cent. died before reaching the age of 30. The rise in the Dick-positive percentages after the age of 30 may therefore point towards a decreasing immunity to the streptococcus and possibly to other organisms.

It must be pointed out, however, that comparing the percentages of Dick-positive patients in the 20–30 and over-30-year age-groups a result is obtained which could be produced by random sampling once in 12 times, and the apparent rise may therefore be due to pure chance.

I am indebted to the director of medical services, Prof. R. J. A. Berry, for permission to publish this paper. The incidental expenses were borne by the Rosa Nelson Burden research fund.

REVIEWS AND NOTICES OF BOOKS

The Anæmias

By Janet Vaughan, M.D. London: Humphrey Milford, Oxford University Press. 1934. Pp. 248. 12*s.* 6*d.*

This monograph is a review of present knowledge of hæmatology, and more especially of the advances that have been made during the last five or six years. It is limited to disturbances of the red cells and their precursors, leukæmia and the hæmorrhagic diseases being mentioned only in so far as they affect the erythron. Dr. Vaughan has succeeded admirably in giving a clear picture of modern conceptions of anæmia, and the book, moreover, contains the outcome of much previously unpublished research in which Dr. Vaughan has been associated with Prof. H. M. Turnbull, whose descriptions of normal erythropoiesis and the pathological anatomy of the anæmias are an important contribution.

One of the most useful tools in hæmatological research has been the exact measurement of the size and the hæmoglobin content of the erythrocytes, and it is therefore fitting that the book should open with a summary of these data. The leading motive of the book is the paramount importance of disturbance in the maturation of the red cells in the causation of anæmia. Dr. Vaughan holds that many of the anæmias which have been attributed to hæmolysis are really the result of disturbances in the metabolism or nutrition of the red cells, and it certainly appears doubtful whether we are justified in describing an anæmia as hæmolytic unless free hæmoglobin is detected in the plasma or the urine. A notable section of the book, which is chiefly founded on personal research with Prof. Turnbull, deals with the anæmia, characterised by the presence in the peripheral blood of a few immature white cells of the myeloid series and immature red cells, which appears in certain cases of carcinomatosis with deposits in the bones, and more seldom in other diseases of the bones. For this condition the title leuco-erythroblastic anæmia is proposed and seems more suitable than the previous equivocal nomenclature. In spite of the reticulocytosis, there is no definite evidence of excessive destruction of the red cells, and it appears that the carcinoma cells in some way disturb the maturation of the red cells and render the bone-marrow dysplastic. Rather similar disturbances of the maturation of the red cells occur in the anæmia due to internal radiation with radio-active substances, of which Dr. Vaughan gives a careful description. This anæmia was first observed by Martland in women who had been employed in painting luminous dials and had absorbed the radio-active material from their brushes. While Dr. Vaughan's monograph was in the press, Hamilton Fairley has reported the inhibition of erythropoiesis produced by malaria, amœbiasis, and other tropical infections, and the reticulocyte crises which follow the destruction of the parasite by the appropriate chemotherapy. It is probable that Dr. Vaughan's chapter on toxic dyshæmopoietic anæmias will need expansion in the future, as more is learnt of the agencies which inhibit erythropoiesis and the mechanism through which they act.

Idiopathic hypochromic anæmia and pernicious anæmia are remaining more and more in the hands of the general practitioner, now that their treatment has been simplified and systematised. The attention of the research worker, the pathologist, and the consultant physician is thus transferred to the obscure cases which have failed to respond to ordinary treatment and are obviously of a different type. It is for such workers that this monograph will prove invaluable. It contains accounts of all the rarer forms of anæmia and the special investigations that may help in diagnosis. It should also provide a stimulus to research. There is still much to be learnt and Dr. Vaughan has not failed to point out the tasks that await the hæmatologist.

Biochemistry of Nitrogen Conservation

An Introduction to the Biochemistry of Nitrogen Conservation. By Gilbert J. Fowler, D.Sc., F.I.C., Professor (retd.) of Biochemistry in the Indian Institute of Science, Bangalore. London: Edward Arnold and Co. 1934. Pp. 280. 12*s.* 6*d.*

Let no man allow a dread of biochemistry, instinctive or acquired, to prevent him reading this book. The problem of the satisfactory utilisation of nitrogenous waste material is that of encouraging the right organisms in the right time and place. A kindly Nature has placed them for man's assistance in both soil and sewage. His acceptance of her gift involves public health, economics, and sociology, in addition to microbiology and biochemistry. All these aspects are discussed in Prof. Fowler's book; and if biochemistry is prominent, it is because the prevention of a smell developing and of nitrogen being utterly wasted depends largely on the application of that science. The author is kind to his readers. For those ignorant of microbiology, a short description of the commoner types of organisms and of bacteriological technique is given. For those who know but little biochemistry a brief summary of the chemistry of proteins and carbohydrates is provided.

The importance of two problems is emphasised. The satisfactory disposal of sewage needs no recommendation; but the appalling waste of nitrogen is perhaps not generally appreciated. The total world consumption of "manufactured nitrogen" for agriculture is 1,300,000 tons per annum. The nitrogen excreted by the world population in urine and fæces is 4,000,000 tons per annum, or over three times as much as is required for agriculture. It is interesting to learn that China has been leading the world in nitrogen conservation. Her farmers are masters in the art of making compost from refuse, and are accustomed to use the nightsoil of her cities for the manuring of their crops. Nowadays, however, all over the world "disposal" is beginning to give way to "conservation." That it is not general in Britain is due to the rich nature of the soil, which has no great need of fertilisers. It is perhaps in India that the demand for conservation is most urgent. On the problems of India the author writes with the authority of experience. The insanitary habits and the use of dried fæces as fuel are particularly unfortunate in a land whose demand for organic manure is practically unlimited.

The book describes the various methods of treatment of sewage and sullage. From the older processes of "dilution" by discharge into lake or sea, of treatment in septic tanks and by aerobic clarification, of final purification in contact beds and trickling filters, we come finally to the activated sludge process with the development of which the author had much to do. By its use sewage is converted into an inoffensive brown humus of great agricultural value and a clear odourless solution of nitrates.

The nitrogen undergoes many chemical reactions in passing from urea and protein to the form of nitrate in which it is assimilated by plants. The description of these reactions and the part played by the various organisms of nitrification, de-nitrification, and nitrogen-fixation is by no means the least interesting part of the book.

Evolution of the Vertebral Column

A Contribution to the Study of Vertebrate Phylogeny. By H. F. Gadow, M.A., Ph.D., F.R.S., late Strickland Curator and Reader in Vertebrate Morphology in the University of Cambridge. Edited by J. F. Gaskell and H. L. H. H. Green. London: Cambridge University Press. 1933. Pp. 356. 25s.

There is something of a melancholy interest in the appearance of this posthumous book. Only a few years ago its author was deservedly famous in the world of morphology, and already he is little more than a name to the student of the subject. The editors have done well in bringing out these notes which, although somewhat fragmentary, were evidently intended for publication in book form. Dr. Gadow's outlook on morphology was derived directly from his great master, Gegenbaur. It is bracing to come across such formal monuments of encyclopædic learning in these days when we have swung away after other (but not therefore false) gods, and have neglected to some extent the hard road which morphologists were wont to tread. We have to return to it from time to time, for only thus can we discover the historical element which, to an increasing degree, is being recognised as essential in the study of the organism. Thus this book will take its place as a record of information and work of reference in the future. It is coloured, of course, by the views of its author, which are not always generally accepted. As an instance we may notice, because of its human interest, that Dr. Gadow seems to have held firmly throughout to his conception of the evolution of the mammalian centrum, while probably most morphologists to-day are inclined to support Cope's reading, which gives the main value to the interdorsal. Dr. Gadow's original view concerning the value of the interventral has always seemed to us to have much in its favour. He does not appear to have been acquainted with Barge's work on occipito-atloid development: it is possible, though not by any means probable, that it might have modified some of his opinions.

This monograph deserves study. The second part, which deals with systemic morphology, presents a mass of observations which would without doubt have been welded into a coherent whole by the author, if he had lived. As they stand they are, at the least, records of a multitude of facts, and in many places and ways are suggestive of the lines along which the mind of their compiler was working. Dr. Gadow had always been interested in vertebral evolution in association with vertebrate evolution, and, as the editors say, the book is a "culmination of investigations and reflections of the greater part of an active life devoted to the morphological problems of the vertebrate phylum." Such a book has a definite place in morphological literature.

The Behaviour of Animals

By E. S. Russell, D.Sc., London: Arnold and Co. 1934. Pp. 184. With 32 illustrations. 10s. 6d.

Those who are distracted with trying to understand why people do what they do may well turn for relief to Dr. Russell's account of the behaviour of animals. He treats the subject in an objective way, as a description of what may be observed, and eschews both the method which seeks to dissect behaviour into a series of tropisms and that which explains the facts in terms of human emotions. The actions of animals must, he says, be looked upon as wholes which, like their bodies, are something more than the sum of the parts, nor can they be understood without reference to the end which is reached any more than development is intelligible without considering the mature product. About instinctive and intelligent behaviour he takes the commonsense view that no sharp separation is possible; purely instinctive action is probably as rare as purely intelligent and the two grade into one another. And he urges that, for the present at any rate, simple observation and experiment should replace attempts at explanations partly in physiological and partly in psychological terms. The book may irritate those who have learned from Dr. Russell's previous books to dislike his organismal outlook, but it is delightfully written, clear, and readable, and it should do much to encourage the accurate natural history studies which he would like to promote.

Die Entzündung des Magens

By Dr. med. Norbert Henning, Privatdozent in the University of Leipzig, Oberarzt in the Medical Clinic. Leipzig: Johann Ambrosius Barth. 1934. Pp. 235. RM.23.40.

The German stomach has been extensively investigated in recent years by two new methods. The radiologist introduces a small quantity of a thin barium emulsion, compresses the organ with a pad applied over the abdominal wall, and screens or photographs it; the barium lodges in the sulci of the mucous membrane and outlines the configuration of the rugæ. The physician passes a gastroscope, usually the new safe flexible instrument, distends the stomach with air, and finds himself able to look at the greater part of its inner surface. Nowhere in Germany have these two methods been practised more thoroughly or more extensively than in the huge Leipzig clinic of Prof. Morawitz.

Dr. Henning has handled the whole gastric material of that clinic for the past six years, and his descriptions and opinions are based with convincing directness on his own experience. Chronic gastritis for him is a morphological change in the gastric mucosa. Radiologically the rugæ appear larger, broader, more irregular than normal, less easily altered in shape by palpation and distension; in atrophic gastritis they are abnormally tenuous. Gastroscopically, swollen stiff distorted rugæ can be easily recognised, the normal smoothness of the epithelial surface may be replaced by a knobby or granular irregularity, multiple superficial erosions and hæmorrhages are often seen; in the atrophic cases the large vessels of the submucosa become visible through the shrunken thinned mucosa. These changes are fully described and illustrated in the book. An extensive correlation of them with microscopic appearances has not been possible, since few cases are treated surgically. A correlation has been attempted, however, with the clinical histories of the patients, and with the chemical alterations in gastric secretion. In this, the author's enthusiasm does not betray his judgment. The facts are that some patients with chronically inflamed stomachs, but without ulcers, give ulcer-like histories; others have had less characteristic dyspepsias, usually only for a year or two, and many have had no gastric symptoms at all.

The chapters on ætiology and treatment are good, but they record no striking advance. There are short accounts of the gastric changes associated with ulcer, carcinoma, gastro-enterostomy, biliary tract affections, and pulmonary tuberculosis. The illustrations include many good photographs taken with the author's gastroscopic camera. The book is a well-written, well-balanced account of the author's experience, set against the background of current German teaching.

The Dinosaurs

By W. E. SWINTON, Ph.D. London: Murby and Co. 1934. Pp. 233. With 25 plates and 20 figures. 15s.

Dr. Swinton has produced a readable and interesting account of that strange group of reptiles which occurred all over the world in triassic, jurassic, and cretaceous times and then disappeared for ever, just as mammals were beginning. Besides the desirable anatomical details of the different groups, there are supplied a number of pictures of reconstructed living specimens and throughout their structure is discussed as an indicator of their habits and modes of life. Many of them were small and possibly graceful beasts; better known are the "fearfully great" (as Owen put it) monsters weighing four or five times as much as a big elephant, which impress visitors to our museums. The most interesting chapter for the general reader is perhaps the one in which Dr. Swinton discusses the cause of their disappearance. Was it intrinsic or extrinsic? Did they grow too large and complicated? Were they too stupid (for in some of them the lumbar enlargement is bigger than the brain)? Did some animal arise that ate their eggs (actually found in Mongolia)? Or was there some development of destructive parasites? The author comes to no conclusion, but inclines to think that the scales were finally weighted against them by widespread geological and climatic changes.

MEDICAL SOCIETIES

SOCIETY OF MEDICAL OFFICERS OF HEALTH

AT a meeting of this society held at Upper Montagu-street, London, on April 27th, under the presidency of Dr. G. STANLEY BANKS, a discussion took place on the

Relationship of Measles and Whooping-cough to Chronic Inflammatory Conditions of the Chest

Dr. C. D. AGASSIZ dealt mainly with cases seen in a children's hospital. He said that non-tuberculous fibrosis of the lung in children was first demonstrated by Andrew Clark, W. J. Hadley, and Arnold Chaplin in 1896, and little further work had been done on the subject until comparatively recently. The subjects of this fibrosis might appear robust, but usually had some cyanosis of lips, cheeks, and ears, especially after exercise. Some had a dusky pigmentation, and others had a thickening of the nose. Anæmic children might not show cyanosis until the anæmia had been treated. Dr. Agassiz had found cyanosis present in half his cases, though in only one-third was the circulation affected. Blood oxygenation was definitely lowered. Clubbing of finger ends varied in degree. Cough was a main symptom in 60 per cent. of the cases; sometimes this was paroxysmal and recurrent, but was usually described as bronchitis. Expectoration was infrequent, occurring only in about 1 in 5 cases; the sputum was scanty and glairy and no tubercle bacilli were found in it, but occasionally streptococci and pneumococci. Hæmoptysis was comparatively rare, though sometimes half an ounce of blood might be coughed up. Dyspnœa was present in over 40 per cent. of the cases, exercise bringing on a degree of dyspnœa out of proportion to the effort. Poor lung expansion sometimes occurred bilaterally, but more often in one lung, the percussion note being impaired especially at the base. There might even be cavernous breathing, and sometimes when the child's mouth was open crackling râles could be heard. These children seemed particularly liable to what appeared to be broncho-pneumonia; there might be signs of lobar pneumonia, or febrile conditions with slight dyspnœa. At this period X rays showed certain characteristic appearances; the heart might be pulled over towards the affected side. In many cases there was a history of several bouts of so-called bronchitis or broncho-pneumonia, often of a persistent winter cough, and of an onset following measles, whooping-cough, or pneumonia. It was probable that the primary lung condition started with the measles or whooping-cough. About 44 per cent. of his cases gave a prior history of measles, 33 per cent. of whooping-cough, 31 per cent. of pneumonia. An important differentiating test was the Mantoux test, especially if negative. If it was positive, other factors must be depended on for distinction from tuberculosis. Non-tuberculous fibrosis could hardly be distinguished from pneumonia, if at the time of the examination the child had pyrexia associated with some consolidation. Where there was no pyrexia and no evident respiratory distress, the diagnosis from pleurisy or pleural effusion should not be difficult. It had so often been taught that measles and whooping-cough were precursors of tuberculosis in children that research should be undertaken. Some died in a pneumonic attack but for the most part the immediate prognosis was good; the remote prognosis was still unknown. A few patients developed bronchiectasis, but most recovered, at least as shown by signs and symptoms, and with the growth of the child any unhealthy area of lung bore a smaller proportion to the whole. Of 42 cases which he had followed up for three to six years, only one died of pulmonary tuberculosis, one developed bronchiectasis, the remainder were fit for work or for school. In the few who developed tuberculosis this was of the slowly advancing fibrotic type. There was need for mass research work on the subject, which could only be thoroughly carried out at the large fever hospitals.

Dr. **George Jessel** spoke from his experience of dispensary practice. Practitioners referred many cases of intermittent or chronic cough to tuberculosis officers. Often the illness had been preceded by measles or whooping-cough; in other cases attacks of those diseases might have occurred in forms too mild for recognition, the chest sequelæ being quite as serious. In 1933, in Dr. Jessel's area, 282 children were examined on account of chest symptoms; 83 of them gave a history of measles or whooping-cough. Of these 83, 5 were found to have pulmonary tuberculosis and 15 non-pulmonary tuberculosis. Of the 199 children who gave no history of measles or whooping-cough 4 had pulmonary tuberculosis, 37 non-pulmonary tuberculosis. Of the total number of 282 children 221 were non-tuberculous; 63 of these gave a history of measles or whooping-cough. Dr. Jessel's conclusions were that the children who had had measles or whooping-cough showed a slightly increased incidence of tuberculosis over those who gave no such history, and that this increase was in the pulmonary form. In earlier years radiologists interpreted as evidences of tuberculosis shadows which now were known to bear a different meaning; for example, heavy shadows at the root of the lung were not necessarily caused by active tuberculosis.

Dr. **J. E. McCartney** dealt with the pathological side. The serious inflammatory condition in the chest was the lobular or broncho-pneumonic condition; it was an extension of capillary bronchitis, and was most severe when involving the terminal bronchioles, as it was accompanied by an interstitial change. This peri-bronchitis was characterised by severe congestion, an outpouring of fibrin, and, later, an extension of the condition into the alveoli. Often as a result of this there was an occlusion of bronchi, followed by collapse and atelectasis. The consequent dullness was often thought to be due to consolidation. The interstitial pneumonia seen in measles presented a different picture, as in it there was practically no exudate; the capillaries tended to be dilated, the alveolar walls were tortuous, the alveolar tissue thickened, the fibroblasts were increased, and the lumen was occluded by an increase of interstitial tissue. Bronchiectasis was caused by three different factors—mechanical, infective, and fibrotic. The mechanical factor operated by partially blocking a bronchus, and expiration needed a special effort. When to the blocked condition infection was added inflammation supervened, with a weakening of the musculature and of the elastic tissue, so that the fibres were torn apart and became œdematous, and the cartilaginous plates were separated. Pfeiffer's bacillus was frequently answerable for this. The fibrotic factor was due to a contraction of the connective tissue, extending from the terminal to the larger bronchioles and to the bronchi. The primary damage done to the lung in measles and broncho-pneumonia was interstitial inflammation, extending upwards from the smaller to the larger bronchi; these became occluded, collapsed, and were replaced by fibrous tissue, and the contraction of the latter gave a train of sequelæ. Much could and should be done in the way of prophylaxis against measles. When the next epidemic occurs supplies of adult human serum should be obtained, attenuated, and used for measles contacts, the public meantime being educated to realise its advantages.

Dr. **J. S. Westwater** said that unfortunately the physician in fever hospitals did not see the end-results of his cases. In the last measles epidemic the results he had observed conformed to those set out by Dr. Jessel, and showed that measles did not deserve the bad name it had acquired. He had traced a number of cases for two to four months after they left hospital. He used the Mantoux test as a means of differentiation from tubercle. Respiratory sequelæ tended to occur in the younger children and in those of any age who had had pulmonary complication; also in those who, before measles, had had some respiratory illness. This seemed to him to suggest that even if measles was attenuated, chronic pulmonary infection would not be eradicated. One of the prime factors in these troubles, he considered, was vitamin deficiency. He had not found that whooping-cough usually jeopardised the child's future.

Dr. **J. N. Dobbie** stressed the lack of resistance in the subjects of these children's complaints, and said some degree of rickets could often be found, though admittedly gross rickets was now much rarer than formerly. Some 70 per cent. of the children aged 5 in the London schools showed minor signs of rickets; and the earliest chance of the onset of the respiratory conditions under discussion was at the age when rickets was commonest and most serious. Prophylaxis against these complaints lay largely with maternity and child welfare centres.

Dr. **V. Freeman** emphasised the constitutional disturbances to the child afflicted with these respiratory diseases. Repeated attacks must lead to interference with the general growth; he had satisfied himself of this by an inquiry into the height-weight ratio at different ages and after different diseases.

The **President** said he had long felt that chronic chest disease in children was not occupying its due place in administrative and public health schemes; also that those who were dealing with such acute conditions as measles and whooping-cough did not quite properly correlate them with the sequelæ seen later. Of 100 children whose cases he had inquired into, 66 could be diagnosed as having chronic pulmonary catarrh or dry bronchiectasis; 60 gave a definite history of measles or whooping-cough, or both, and 6 had had pneumonia. Forty-two of them were negative to tuberculin tests, also to the Mantoux and von Pirquet tests. He agreed with what had been said about malnutrition in these children. In one industrial area he formed the conclusion that about 80 per cent. of all the children examined had some signs of rickets, possibly a general avitaminosis, of which rickets was only one manifestation.

Dr. **Agassiz**, in a brief reply, said a child with a rickety chest and a history of bronchitis probably had fibrosis, not tuberculosis. To attribute these chest conditions to vitamin deficiency was, he thought, carrying the cause too far back; but the connexion with measles and whooping-cough was very definite. The great need at fever hospitals was frequent X ray examinations and a follow-up of the cases.

Dr. **Jessel**, in reply, said that in the provinces very few of these children came into hospitals, a fact which accounted for the small proportion of fibrotic cases found in them.

EUGENICS IN PRACTICE

A Series of Essays suggested by the Report of the Brock Committee

I.—MENTAL DEFECT IN THE COMMUNITY: IS IT INCREASING?

In considering any steps which should be taken to control mental deficiency in the community, it is obviously of the first importance to know the extent of the problem. The Royal Commission, appointed in 1904 to consider, among other things, the existing methods of dealing with the mentally defective, found at the outset of their inquiry that there were no statistics available concerning the incidence of defect in the community. They therefore caused surveys to be made in different localities and by this means they estimated the incidence to be 4·6 per 1000 in the general population. In 1924 the Wood Committee, appointed jointly by the Board of Education and the Board of Control, met to consider certain administrative problems. This time a much more extensive survey was undertaken and the incidence of mental deficiency was estimated at 8·6 per 1000. The relative proportions of the different grades were found to be approximately 5 idiots, 20 imbeciles, and 75 feeble-minded to every 100 aments. In both these surveys the incidence in rural districts was found to be significantly higher than the incidence in towns. Superficially, it appears that the mentally defective had doubled their numbers in the course of 20 years. This conclusion is, however, held to be invalid by many authorities. In both these surveys the total number of defectives was probably under-estimated but, owing to greatly improved facilities for ascertainment, the alter survey was the more accurate.

The report (Cmd. 4485) of the Departmental Committee on Sterilisation, conveniently known as the Brock Committee, refers to the question of the extent of the problem in the following terms: "On this point the Wood Committee found it difficult to come to any definite conclusion, and we share their difficulty." The report goes on to state that the impression created by the statistics put before the Brock Committee is that the incidence of mental defect is increasing, though not rapidly. The increase may be due partly to better ascertainment and partly to improvements in the public health services calculated to keep alive defectives who would otherwise have died at a younger age. At the same time it is pointed out that there is no ground for the alarmist views expressed in some quarters that there is wholesale racial deterioration.

EXTENT OF DEFECT IS A MATTER OF DEFINITION

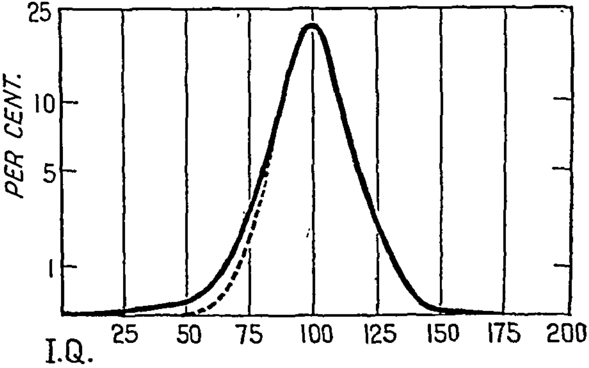
The definition of defect in the Mental Deficiency Acts is not based on mental tests, and authorities differ in their interpretation of the criteria by which it is judged. Though valuable to the administrator, the knowledge of the incidence of defect, as defined by the law, cannot be of much use in considering the problem genetically. As the Brock report states:

> "The definition in the Mental Deficiency Acts is based upon social adaptability, and the definition in the Education Acts upon educability. In other words, both statutory definitions rest upon the end result of the mental condition . . . . and not upon the clinical characteristics."

In other countries different definitions are used, but they are also subject to ambiguity. But, as Prof. R. A. Fisher points out, the educational criterion of deficiency is of greater significance than is the more sociological criterion of the Mental Deficiency Acts.

Thus the general distribution of ability in mental and scholastic tests forms a better basis for the genetic study of mental deficiency than the results of the surveys undertaken by the Royal Commission or the Wood Committee. Such investigations as that carried out by Burt (1921) on the London school population and the recent inquiry made by the Scottish Council for Research in Education (1933)[1] furnish us with suggestive material from this aspect. Unfortunately these surveys suffer from the disadvantage that many children at the upper or lower ends of the scale escaped observation. We can, however, infer from them that the distribution of intelligence, as judged by standardised tests, forms a continuous curve (shown in the diagram) from the lowest idiot to the cleverest scholarship child. The curve approximates, though not very closely, to a normal frequency distribution. There is some irregularity in the lower part of the scale and poor mental endowment appears to be more prevalent than would be expected if ability were distributed symmetrically round a norm. Practically no idiots and few imbeciles can be said to come within the normal range, though probably many of the feeble-minded belong to it. In practice the line of demarcation between normal and abnormal intelligence must, however, be drawn arbitrarily and the incidence of mental deficiency varies according to where this line is drawn. The position of this line is partly determined by administrative considerations. In London, where the borderline is taken to be between the intelligence quotients[2] (or mental ratios) of 66 and 75, provision in the special schools is made for about 1·5 per cent. of the school population. Similar figures hold for many other towns. On the basis of statistics of normal

Diagram showing distribution of intelligence among school-children



The figures at the foot of the diagram represent intelligence quotients (I.Q.): the upright scale denotes the proportion of individuals, per cent., who are distributed at the various grades of intelligence. The upright scale is logarithmic, so that the apex of the curve is very much reduced in height. The dark outline indicates the range of intelligence in the general community: it is not quite a normal probability distribution curve, since it is slightly skew towards the left. The dotted line indicates the limits of the distribution of intelligence found among ordinary school-children. The small segment of the total population to the left of the dotted line consists of the special school population, together with children whose mental grade is too low even for the special schools. The diagram shows (*a*) that there is considerable overlapping of I.Q. between the two groups to the left and right of the dotted line; and (*b*) that the proportion of children judged to be mentally defective depends upon where the dotted line is drawn. The diagram is based mainly on figures given by Cyril Burt in "Mental and Scholastic Tests," London, 1927, pp. 161–162.

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[1] The Intelligence of Scottish Children, Univ. of Lond. Press.

[2] In children the intelligence quotient (or mental ratio) is the ratio of mental age to chronological age expressed as a percentage. A fictitious maximum of 14 to 16 years is assumed for the chronological age of adults.

children it has been estimated that not fewer than 1·5 and not more than 3 per cent. of Scottish children fall below the boundary line drawn at an intelligence quotient of 70. In the future, when intelligence tests have reached a much higher standard of perfection than they at present enjoy, it may be possible to state exactly what proportion of children are below or above any given limit of mental ability. Until this is so we shall not be able to determine precisely whether or not mental deficiency, in a strict sense, is increasing.

REASONS FOR SUSPECTING AN INCREASE

The evidence for the increase of mental deficiency in the community is partly inferential. The following line of argument is worthy of attention. If the members of a given population mate with one another at random with respect to any given hereditary quality, the proportion of individuals possessing this character remains constant from generation to generation. On the other hand, if mating does not take place at random, stable proportions of the different genetic types in the population will not be maintained. There is evidence that, in the human species, mating is not random where certain characters are concerned, but the degree of assortation has not been found to be great with regard to any character except intelligence. As pointed out in the Brock report (p. 41), persons of like intelligence tend to marry one another. Some of the statistics quoted in appendices support this view.[3] If mental ability were determined entirely by multiple hereditary factors, this kind of assortative mating would cause a continual increase of the more intelligent and less intelligent groups of the population at the expense of those in the middle. The report, moreover, contains an account of a survey, instigated by the joint committee, which records, among other things, the mental ability of the children born to mothers or fathers judged by local authorities (or their representatives) to be mentally defective. The figures show that about one-third[4] of such children, on reaching maturity, are judged to be defective (p. 66); this conclusion applies equally whether the parents were certifiable under the Education Acts or the Mental Deficiency Acts. Now, if the incidence of mental defect is something like 1 per cent. and if mentally defective persons mate at random, it is unlikely, on general principles, that as many as a third of their children will be defective; it can be shown algebraically[5] that the proportion should probably be nearer one-tenth. Thus the high proportion of defective children born to defective parents is evidence for supposing that such persons usually select, for their partners, individuals whose mentality is not much greater than their own. This argument can only apply to defectives who are intelligent enough to live in the general community, and the conclusion is offset to some extent by the fact that idiots and imbeciles hardly ever become parents. The effect of assortative mating would be enhanced if the feeble-minded were especially prolific, but, as the Brock report states, "the supposed abnormal fertility of defectives is . . . largely mythical." All these considerations give some grounds for supposing that mental defect in the community is slowly increasing.

ENVIRONMENTAL INFLUENCES

We have so far been assuming that mental ability is determined only by heredity. Since the hypothesis is a very rough approximation indeed, the conclusion is also approximate. Actually, mental defect has many different forms and adverse environmental influences enter into the causation in a large proportion of cases. In a comparatively small proportion of instances the causation can be looked upon, for practical purposes, as entirely due to environmental factors (p. 19).

Since we are considering what reasons there are for the belief that mental deficiency is increasing, we may ask, to what extent environmental influences can determine fluctuations in incidence? On this topic the Brock report has little to say. The application of the principles of mental and physical hygiene may be reasonably expected to raise the general level of mental as well as physical efficiency in the community. A few principles can be formulated concerning special clinical types. The treatment of acquired syphilis, for example, should have diminished the incidence of amentia due to congenital syphilis during the last 30 years. Unfortunately there are no available figures by which to check this suggestion. Similarly, improved obstetrical technique may have brought about a decrease in the incidence of amentia due to birth injury. The causation of the special type of amentia, known as mongolism, is still a subject of discussion, but there can be little doubt that the maternal age at the birth of the child is the most important factor. If there is a growing tendency for women to marry later in life than formerly, then an increase in the incidence of mongolism is to be definitely expected. Encephalitis lethargica is now known to be an important cause of mental retardation, but the disease was unknown (or unrecognised) 20 years ago.

There remains the interesting problem of the rare diseases associated with severe mental deficiency which are known to be inherited in a fairly simple manner. Amaurotic idiocy is a disease which behaves as a Mendelian recessive, and other forms of idiocy or imbecility due to recessive genes almost certainly exist (p. 13). Natural selection would eliminate such conditions as these very slowly from the community. We can argue, from the fact that these diseases continue to exist, that they are sustained by a mutation-rate adequate to keep their incidence approximately constant. At present little is known about the causes of mutation in general, still less about these circumstances as applied to man. Here are to be found some of the avenues for future research (p. 53).

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[3] See tables at foot of p. 102 and top of p. 83, which show that the number of families where both parents are defective is greater than would be expected from a random assortment.

[4] A close scrutiny of the figures in the tables suggests that many of the families were selected on account of the presence of defective children and that mothers of the same grade who had no defective children were not adequately represented in the sample. But even if the proportion were no more than one-fifth this would not alter the argument.

[5] Assume that mental grade depends upon multiple Mendelian factors. By a theorem of Fisher's, used in analysing physical stature, it follows that mental grade behaves approximately like an intermediate Mendelian character and that the heterozygote, or carrier, is intermediate between the normal and homozygous types. Call B the gene responsible for mental deficiency. Then the genotype AA is normal and has I.Q. (say) 100. The heterozygous genotype AB is dull and has I.Q. (say) 80. The homozygous genotype BB is defective and has I.Q. (say) 60. In a system of random mating these types have frequencies of $(1 - x)^2$, $2x(1 - x)$ and x^2 respectively, where x^2 is the incidence of defectives in the general community. If x^2 is equal to one in a hundred, these frequencies are as 81 : 18 : 1. (All this applies just the same if B is a recessive gene—as some people believe it to be—and the carrier has I.Q. 100 instead of I.Q. 80.) A mentally defective person, mating at random, 81 times out of 100, will choose a normal mate and there will be no defective children. In 18 cases out of 100 a dull mate will be chosen and, here, half the children will be affected. Once in a hundred matings both parents will be defective and all the children will be affected.

Hence, out of every hundred children having a mentally defective parent $(0 \times 81) + (\frac{1}{2} \times 18) + (1 \times 1) = 10$ children will be affected. That is to say, if the incidence of mental defect is something like one per cent., and if mentally defective persons mate at random the proportion of defective children born to a defective parent should average about one-tenth.

THE LANCET

LONDON: SATURDAY, MAY 12, 1934

PATHOGENESIS OF MAMMARY CANCER

The experimental investigation of carcinogenesis in selectively bred strains of mice which is being carried out in the Institut du Radium in Paris is yielding results of exceptional interest. By selective breeding Mme. Dobrovadskaia-Zawadskaia had succeeded in establishing strains with a very high or very low incidence of spontaneous cancer of the mamma in the female mice. The males never develop mammary cancer, not even in the strains with a high incidence. Last year we drew attention [1] to a short communication by Dr. A. Lacassagne in which he recorded the remarkable observation that the repeated injections of a pure preparation of folliculin into young males belonging to a strain with a high incidence of mammary cancer was followed by the appearance of mammary cancer in these animals. The tumours were sometimes multiple and appeared at a relatively early age. No such effect was then observed either in the males or in the females belonging to strains with a low incidence. The work has been continued and Lacassagne now reports [2] the frequent appearance after repeated injections of folliculin of mammary cancer, from 50–80 per cent., in animals belonging to two strains which normally have an incidence of only 2 per cent. The tumours appeared, however, not as frequently and at a much higher age in these two strains, between the tenth and fifteenth months, while in the strain with a high incidence 80 per cent. of the animals, including the males, had developed cancer between the fourth and the sixth months. A physiological difference observed between a strain with a high and one with a low incidence of spontaneous mammary cancer is that the œstrous cycle is much more prolonged and more regular in the former than in the latter, that the injection of equal doses of folliculin produces a more rapid and more intense vaginal reaction in the former than in the latter, and that the mammary hyperplasia produced by repeated injections of equal doses of folliculin sets in sooner and is more massive in the former than in the latter, both in the males and in the females. In the strains with a particularly high incidence of spontaneous mammary cancer the mammary tissue is therefore particularly susceptible to the action of folliculin. It is this factor of susceptibility—not the disease cancer itself—which is inherited; and it is this factor of susceptibility which is responsible for the exceptionally high incidence of spontaneous mammary cancer in these strains. Dr. W. Cramer has pointed out [3] the importance of this factor of susceptibility in determining the incidence of cancer in man, but it must be borne in mind that while in man the total incidence of cancer is distributed over a number of organs, in mice it is focused mainly on one organ—viz., the mamma.

In response to the action of folliculin the mammary tissue undergoes hyperplasia corresponding to the hyperplasia induced in the skin of mice by some form of chronic irritation such as painting with tar or pure carcinogenic substances. A process of hyperplasia similar to that induced experimentally by the repeated injection of folliculin has also been found in the mammary gland of middle-aged and old mice in the course of their lives, as was shown 24 years ago by Dr. M. Haaland in the fourth scientific report of the Imperial Cancer Research Fund. His figures show hyperplastic nodules composed of acini containing collections of stagnant secretion, which sometimes leads to a distension into cystic spaces. Another relevant fact which may be recalled here is the observation of Prof. N. Goormaghtigh,[4] that the repeated injection into female mice of a preparation which he called folliculin, but which was probably less pure than that used by Lacassagne, produced a condition of the mamma closely resembling what is called in the human mammary gland the maladie de Reclus or Schimmelbusch's disease. Sir Lenthal Cheatle has drawn attention [5] to the fact that in women Schimmelbusch's disease is frequently followed by carcinoma. It is in fact a precancerous condition. We have here another example of the close similarity which exists between the pathogenesis of cancer in animals, whether spontaneous or induced experimentally, and in man.

The nature of the final step, the actual transformation of a normal cell into a malignant one, is as yet unknown. We do know however that this change occurs in one or several sharply circumscribed centres and not in all the cells of the mammary gland simultaneously. We also know from the work of E. L. Kennaway and F. W. Cook [6] that a close chemical relationship exists between certain carcinogenic substances—i.e., substances which produce cancer when applied repeatedly to the skin of mice—and to certain constituents and secretions of normal cells, especially œstrogenic substances. It is only a few years ago that a distinguished authority committed himself to the statement that cancer is a mystery the solution of which surpasses the wit of man. Such pessimism is out of date. Cancer will remain a mystery to those who look for a single factor as the cause of cancer: civilisation, diet, changes in hydrogen-ion concentration, cosmic rays, or what not. They ignore the mass of careful observations on animals and on man patiently collected during the last 30 years or more. But to those who take the trouble to inform themselves, these observations serve as a guide to an understanding of the disease as being the result of a multiplicity of causative factors acting successively and playing an essential part in bringing about the eventual transformation of a normal cell into a malignant one. We are entitled to assume that this final cellular change is essentially the same in whatever tissue it occurs. Only in this sense is it possible to speak of *the cause* of cancer and to admit that *the cause* of cancer is unknown. But the processes which lead up to this final stage may be different for each tissue and in this sense each tissue may be said to have its *causes* and its own specific pathogenesis.

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[1] The Lancet, 1933, i., 594.

[2] Compt. Rend. de la Soc. de Biologie, March 3rd, p. 937.

[3] The Lancet, Jan. 6th, p. 1.

[4] Bull. de l'Ass. Franc. pour l'étude du cancer, 1930, xix., 527.

[5] Cancer Review, 1930, v., 81.

[6] Proc. Roy. Soc. B., 1933, cxiii., 273.

THE ACTION OF LEAD ON THE KIDNEY

GENERALISED arterio-sclerosis is often seen in individuals who have long been exposed to lead, and chronic nephritis may also be observed. That these result from the action of lead cannot be proved, but their incidence in lead workers is high. Some have argued that such changes in the arteries and kidneys, occurring as they do in lead workers giving no history of attacks of colic or palsy, should not be attributed to lead but should be regarded as due to the same factors which cause decrescent arterio-sclerosis in persons not exposed to lead. Such reasoning is tantamount to demanding a history of delirium tremens in a chronic drinker before relating a cirrhosis of the liver to his alcoholism. Medical practitioners in Brisbane and other parts of Queensland have long held that chronic nephritis, terminating fatally in uræmia, is more prevalent in that part of Australia than it is in other parts of the world. In 1929 Dr. D. G. CROLL put this impression on a sound statistical basis by showing[1] from the death returns of the ten-year period 1917–26 that 1309 persons per 800,000 of the population died of chronic nephritis in Queensland before the age of 40, whereas in the other three States of the Commonwealth the number was 436, 421, and 418. A graph of the deaths in the various age-groups indicates clearly that a cause non-existent or non-operative in the other States was responsible for this strangely high mortality in Queensland, with its peak in the 20 to 29 age-group. It fell to Dr. L. J. J. NYE of Brisbane to relate this mortality to chronic plumbism in a work[2] which may be regarded as the most important contribution of Queensland to medical knowledge since T. L. BANCROFT discovered the adult filarial worm there 58 years ago.

Cases of wrist-drop and foot-drop were first described in Queensland children in 1892. In 1897 Mr. J. L. GIBSON began to come across weakness of the external recti combined with papillœdema, which he regarded as an early and therefore important sign of lead poisoning; in 15 years he saw 54 of such cases. In seeking a cause for the plumbism, NYE was led to examine closely the habits of the children. In Queensland houses are commonly built with verandas whose railings are of wood, which, especially in the neighbourhood of towns, are usually painted with white lead paint. In that semi-tropical climate the sun soon converts this paint into a powdery substance, which rubs off easily on the hands, and this has been found to be a soluble carbonate of lead. In the summer young children spend a large part of their time on the verandas, and the younger members of the families affected are generally in the habit of biting their nails or sucking their fingers. Among children a local pastime was discovered which consisted in licking the rain drops from the veranda railings. Quite recently Dr. S. F. MCDONALD, going over the same ground, accepted[3] the "paint-fingers-mouth" theory of causation as the best working hypothesis. As a rule, the patient first comes under medical observation early in adolescence, the history being that for years the child has not been as well as other children. In later stages this lassitude increases, and anæmia, vomiting, failing vision, and often epistaxis occur. Elevation of blood pressure is invariably present, and is accompanied by hypertrophy of the heart. Occasionally cerebral hæmorrhage resulting in hemiplegia has been observed. Retinal vascular changes, with engorgement of veins, hæmorrhages, exudate, and choked discs are commonly seen. Œdema is inconspicuous, and renal failure ending in uræmia is the usual conclusion.

A federal investigation published in 1932 upheld the contention that kidney disease in young people in Queensland is extraordinarily prevalent. It reached the tentative conclusion that the chronic nephritis common in Queensland arises, as elsewhere, as a result of many factors productive of kidney damage, including principally familial weakness of the kidney fabric, damage produced by congenital syphilis, and conditions set up as the result of the acute or prolonged action of toxins derived from pathogenic organisms. In Brisbane, in cases where such predispositions exist, the concurrent ingestion of infinitesimal doses of lead from an undetermined source appears in a proportion of cases to precipitate a fatal issue many years earlier than would otherwise be the case, weeding out the great mass of chronic nephritics before they attain the age of 40. Since whatever factor is operating in Brisbane appears to be operative also in several other cities of the Brisbane type, the possibility of lead poisoning being a factor in these areas, though it does not figure in hospital records, cannot be entirely discounted, but must be investigated before findings can be conclusive. The work on which these tentative findings are based is included in the full report submitted to the Director-General of Health in Canberra. NYE replied to the findings of the official inquiry by showing that after a careful review of the statistical, clinical, environmental, and experimental evidence which has been collected in the federal report and in his work, it must be admitted that lead poisoning in childhood is at least one factor which is responsible for the high rate of mortality from chronic nephritis in Queensland—a rate, however, which happily now shows some signs of abating. The amount of positive evidence incriminating lead paint is indeed so overwhelming that it seems almost perverse to insist on a further search for other causes before taking preventive measures against poisoning. NYE's work emphatically teaches the lesson of the damaging effects of lead on young tissue and strengthens the demand that lead in any form should be banished from places which serve as a playground for restless and meddlesome youth.

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[1] Med. Jour. Australia, 1929, ii., 144; THE LANCET, 1929, ii., 830.

[2] Chronic Nephritis and Lead Poisoning. Sydney: Angus and Robertson. 1933. Pp. 145. 12s. 6d.

[3] Med. Jour. Australia, March 3rd, 1934, p. 293.

TUBERCULOUS EMPYEMA

ONE of the gravest complications of pulmonary tuberculosis is tuberculous empyema, but the outlook should not be regarded as hopeless even though secondary infection with pyogenic organisms has occurred. In some instances a pleural cavity previously full of tuberculous pus will remain dry after two or three simple aspirations or air replacements—a result as surprising as it is gratifying, for such exudate may be loaded with tubercle bacilli. In other instances pus containing pneumococci or other organisms in addition to tubercle bacilli may be sterilised by the injection of aniline dyes or replaced by gomenol oil or by a solution of gelatin containing euflavine as in the method advocated by Crocket. It is only when such methods as these fail, or when severe toxæmia proves that a pyothorax is of malignant type, that surgical intervention becomes necessary. The evacuation of pus, whether by closed or open drainage, is essential in such cases and the risks of further infection from without, of non-expansion of the lung, and of a permanent sinus must be incurred.

In a recent review[1] of the subject J. C. JONES and J. ALEXANDER describe the methods they have employed in the treatment of 70 consecutive cases, and their results are classified in four groups.

Group 1 consists of tuberculous empyema uncomplicated either by active tuberculous disease in the lungs or by the presence of secondary organisms. This, the most benign form, is unfortunately the least common. It usually yields to repeated aspirations which, needless to say, must be performed under strictly aseptic conditions.

Group 2 includes those cases of tuberculous empyema in which pyogenic infection has already occurred, but excludes those in which there is evidence of active tuberculous disease in the lungs. The object here is to evacuate the pus and to cause the lung to re-expand, and this may sometimes be accomplished by aspirations. Irrigations and the injection of antiseptics of the aniline group may assist in cleansing the pleural cavity. If these fail, closed or open drainage will be necessary, for if aspiration is frequently repeated sooner or later further infection will occur. Closed or open drainage should therefore be instituted as soon as it is evident that aspiration has failed. Phrenic avulsion by reducing its capacity will assist in the obliteration of the pleural cavity, but an extrapleural thoracoplasty is often necessary to complete its closure.

Group 3 includes tuberculous empyemata uncontaminated by secondary infection but associated with active tuberculous disease of the lungs. If simple aspiration with air replacement fails the physician finds himself on the horns of a dilemma. If he seeks to cure the pyothorax by bringing its walls into apposition, the ideal method in the treatment of all empyemata, he must either encourage expansion of a lung only recently collapsed as a therapeutic measure for the treatment of active disease, or he must bring the chest wall into contact with the collapsed lung. If there is still hope that the pulmonary disease may be arrested thoracoplasty is indicated, usually preceded by phrenicectomy. It is encouraging to note that of 21 such cases submitted to thoracoplasty 16 could be claimed as "cures," that is to say, obliteration of the empyema cavity was secured without the persistence of a sinus, while arrest of the pulmonary disease was indicated either by the absence of expectoration or of sputum containing tubercle bacilli.

Group 4 is composed of the gravest types of disease in which a secondarily infected tuberculous empyema is associated with active phthisis. An attempt may be made to sterilise the empyema by aspirations and irrigations, though it is only very rarely that this object is attained. Closed or open drainage is usually essential, and though re-expansion of a therapeutically collapsed lung may follow, such a result may even be desirable if the patient suffers from dyspnœa and if the contralateral lung is also the seat of tuberculous disease. In the rare instances in which the opposite lung remains healthy, drainage and irrigation may produce so great an improvement in the patient's general condition and so satisfactory a cleansing of the diseased pleura that a thoracoplasty may be undertaken with some hope of a successful result.

The authors maintain that the prevailing prejudice against operation in the treatment of tuberculous empyemata is not justified by their experience of the risks attaching to it. Though of the 70 patients 23 died only 6 deaths could be attributed to surgical interference, and the same number of deaths occurred among patients who had been treated by aspiration alone. Cures were attributed to thoracoplasty in 32 out of 43 cases so treated. Failures to secure the adequate drainage, upon the success of which the result of thoracoplasty at a later stage may depend, are often due to faulty technique. The drainage-tube may be inserted at too high a level, it may be too short or too long or too narrow, or its removal before the cavity is obliterated or thoracoplasty decided upon may lead to failure. A thoracoplasty may be too timidly undertaken or performed "in so few stages as to make the operative mortality frightfully high." On the other hand, it might be pointed out that there are limits to the endurance of patients, especially of patients whose morale has already been undermined by a lingering disease.

INTERNATIONAL MEDICINE

THE Milroy Lectures of the Royal College of Physicians of London are concluded this week; they have been expanded by the lecturer so as to bring the history up to date of international coöperation in public health, as represented by the general work of the health organisation of the League of Nations. Criticism of the League of Nations is common. The reasons why it has not done certain things which it has tried to do, as well as other things which it has never tried to do, are imperfectly understood, as is evident from everyday comment; but no one who has followed its work for international health can fail to see here much fine achievement. This is what we should expect, for the international nature of medicine is so clear to all that even the most ardent critic of the League of Nations, and indeed of any attempt at international understandings, will allow that coöperation to eradicate disease and to prevent its spread from one country to another is good for the world. Sir George Buchanan, a member since its foundation of the League of Nations Health Committee and our Government Representative at the Office International d'Hygiène publique, has been able in this series of lectures to tell a fine story of international endeavour.

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[1] Amer. Rev. of Tub., 1934, xxix., 230.

ANNOTATIONS

A CLINICAL RESEARCH UNIT

A NEW departure in hospital practice is announced from the Middlesex Hospital, where a gift of £15,000 has been received from Mr. S. A. Courtauld to found a Clinical Research Unit. The unit will be under the direction of the medical school council, and its activities will be directed to the intensive investigation of selected diseases. Mr. Courtauld's generous and discriminating donation is the culmination of a magnificent series of gifts to the hospital and school, which he has already endowed with laboratory services fitting the institution to serve as a basis of this original and important departure. The unit will consist of small wards of 1 to 3 beds, in all 15 to 20 beds, and will be provided with clinical lecture theatre, test rooms, and offices, and be under the control of the heads of the Bland-Sutton institute of pathology, the Courtauld institute of biochemistry and the department of physiology, while the work throughout is to be conducted in collaboration with members of the staff as they happen to be particularly interested in any diseases or conditions upon which the investigations are being concentrated. A close link is thus forged between the hospital, the medical school, and the research laboratories, for the professorial staff will have direct contact with and share responsibility in the treatment of patients, the fruits of laboratory work being thus carried promptly into the wards. The relations between the clinical and academic staffs of the hospital will be strengthened. The patients, moreover, being in the care of the unit, will have the advantage of prolonged stay under treatment when it is found advisable; they will not lose by the compulsion that must exist in general wards to discharge patients at the earliest moment that they can be moved, their beds being urgently required. In particular those who are not responding to treatment will obtain the advantage of more specialised observation. This association of the medical school in the control over beds in the hospital, sharing in the ultimate responsibility of the Board for the patients, is almost a revolutionary departure, but it is one under which advantage should accrue to the patients concerned, to the students of the school, and, what is more important, to the development of medical science..

DIABETES IN CHILDREN

IT is still too soon to estimate the expectation of life in diabetics treated with insulin from childhood; but we can say at least that this disease has now become compatible not only with life but with normal development, growth, and activity. E. P. Joslin [1] has pointed out that whereas in pre-insulin days an elderly diabetic lived about five times as long as a diabetic child, the balance is now weighed in the other direction. Untreated, these children are quickly reduced to a state of cachexia and misery, and if they live sufficiently long are stunted and infantile; but with insulin and under suitable conditions they can hold their own with contemporaries and have every chance of attaining maturity and parenthood. This change in prognosis was considered in our columns on April 14th by Dr. R. D. Lawrence, and he showed that the result depends largely on the care with which treatment is carried out. Fortunately, however, habits are readily acquired by the young, and although strict dieting is never altogether simple, there is usually less alcoholic and dietetic excess to unlearn in childhood than in later life, while the relatively high carbohydrate diets now in vogue make the régime much less trying than formerly. The actual injection of insulin becomes with many children a routine which is hardly more irksome than cleaning the teeth or evacuating the bowels, and the measurement and administration of the drug can be undertaken by most normally intelligent children over ten. For those to whom the insertion of the needle remains a focal point of unhappiness, an ingenious automatic syringe has recently been devised by H. Busher [2]: the syringe, after being filled, is held under tension by a spring; the apparatus is "cocked," placed firmly against the skin, and released by touching a trigger; and the injection is thus effected, it is said, with great rapidity and a minimum of discomfort.

Granted ordinary care there remain various unavoidable complications—infections are far the most important—which may need special and efficient treatment if they are not to end with the patient in coma. In preventing such disasters it is obviously useful to have frequent blood-sugar and urinary examinations and trained assistance at the first evidence of ill-health; but Dr. Leslie Cole's paper, completed in our present issue, shows that good results can be got even in comparatively poor homes in an agricultural district, where hospital visits are infrequent and medical help is hard to come by. His case reports make very encouraging reading, since nearly all the children are within the ordinary limits of height and weight, show no limitation of physical or mental activity, and have developed normally, although in some of the older girls there has been amenorrhœa or irregular menstruation. When these things are possible under difficult conditions one cannot but feel that the outlook for the child with diabetes is really hopeful, and look forward to the time when something corresponding to insulin can be given without injection.

TRAUMATIC SHOCK

William Clowes in 1568 attributed the prostration following severe injury to the action of some noxious substance produced in the wounded area. A more complete knowledge of the anatomy of the circulatory and nervous systems led subsequent workers to seek an explanation in a derangement of one or both of these systems, but references to a toxic agent appear at intervals in the writings of the last four hundred years, and the toxic theory of shock did not reach its apogee until towards the end of the late war. Cannon and Bayliss [3] produced a state of traumatic shock in cats by subjecting one extremity to blows, when the blood pressure declined and in a brief space they died. As cause of death hæmorrhage could be excluded, for the weight of the damaged extremity showed that the local fluid loss was comparatively trivial. Section of the femoral and sciatic nerves or even of the spinal cord failed to prolong life, and it appeared, therefore, that a third factor must be concerned. It was known that injection of histamine—a substance which can be prepared from most animal tissues—causes a fall in blood pressure and death in the experimental animal, and Cannon and Bayliss came to the conclusion that this substance or some such product was absorbed from the traumatised area and was responsible for death. During the last ten years, however, much additional experimental work on these lines has been done in the United States and on the continent, and the toxic theory of shock has found few supporters. To A. Blalock, one of the most industrious investigators in this field, belongs the credit of having established the importance of fluid loss, not only in experiments of the Cannon and Bayliss type, but in trauma to the intestines and in experimental burns. He repeated the weighing experiments of Cannon and found that if a hindquarter amputation was done instead of a circular amputation of the limb a significant increase in weight could be demonstrated. In summarising his experimental[4] work he also gives an excellent résumé of the history of the subject and of its clinical aspects. He accepts the concept of primary and secondary shock, attributing the former to nervous inhibition and the latter to fluid loss into the traumatised area. Although no evidence of a toxin-formation has been discovered in any of his experiments, he retains this in his mind as a theoretical possibility. In discussing treatment he rightly emphasises the importance of preventive remedies such as warmth and an adequate supply of fluid. Experiment in what he terms "established" shock has been of little value. As he says in his concluding paragraph, there is at present no satisfactory treatment for shock which has persisted several hours.

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[1] New Eng. Jour. Med., 1933, ccix., 519.

[2] Jour. Amer. Med. Assoc., April 7th, 1934, p. 1152.

[3] See THE LANCET, 1919, i., 256.

THE EXTENSION OF LIFE

In a study of mortality in Great Britain and Sweden published in our issue of March 31st, the authors, Dr. Kermack, Colonel McKendrick, and Dr. McKinlay, found that the death-rates at ages have been declining in such a way as to suggest that the expectation of life is mainly determined by conditions obtaining during the child's earlier years. This raises the interesting problem (referred to in a leading article in the same issue) of how far it may be possible to predict future decreases of the death-rates at various ages, and thus calculate the real expectation of life of persons now living.

The extent to which life is likely to lengthen has recently been considered by Louis I. Dublin and A. J. Lotka in an inquiry into the history of longevity in the United States.[5] Large gains in longevity have, they show, been recorded in the last hundred years, and more particularly the last forty. The outlook for further improvement in the average length of life is, they think, entirely favourable, "since we have not yet fully availed ourselves of the knowledge which we now possess towards reducing mortality." To answer the speculative question of the ultimately attainable expectation of life, they have constructed a hypothetical life table, based fundamentally upon the New Zealand life table for females, 1931 (together with the experience of the Metropolitan Life Insurance Company among some of the more favoured classes of policyholders); for "it is surely reasonable to expect that what New Zealand is achieving at present we may hope to exceed in due course." On this basis they have assumed that ultimately the deaths in the first year of life may be reduced from the value of about 60 per 1000 which now prevails to the low level of 25. At age 1 they regard as possible a reduction of 10 per cent. from the mortality observed among females in New Zealand, 1931, while they adopt at older ages a slightly greater, and increasing, improvement, reaching 15 per cent. at age 21. They then assume that this reduction of 15 per cent. from the mortality of the New Zealand table is attainable for all succeeding ages up to 74, after which age considerably smaller improvements are predicted. Construction of a life table on this basis gives an expectation of life at birth of very nearly 70 years compared with 49 years in the United States life table of 1901 and with 60 years in the table of 1930. Comparison of the course through life of the populations in these three tables is of interest. The cohort of 100,000 persons born is reduced to three-quarters of its original number at age 24 in the 1901 table, age 49 in the 1930 table, and age 63 in the hypothetical table; one-half will remain at ages 58, 67, and 76, and one-quarter at ages 74, 78, and 83.

It might be maintained that the application of the New Zealand rates (still further reduced) to the population of the United States, with its large urban and industrialised areas, is too optimistic—that the Scottish authors are on safer ground in their observations of the past course of the death-rate and its regularity in the self-same area for which prediction is attempted. On the other hand, in the light of the experience among ordinary policyholders of the Metropolitan Life Insurance Company, Lotka and Dublin do not think that the values they have adopted for the United States are unduly favourable or incapable of eventual attainment. They see no reason why in the near future the "average" man should not be brought up to the level of the more favoured classes. If this optimism should prove well-founded the increasing proportion of old people in the community will have to be reckoned with more seriously in economic and social organisation. The coincidence of declining birth- and death-rates is shifting age-distribution to an extent that is not yet generally appreciated.

RETINAL ABIOTROPHY

The retina offers exceptional facilities for the study of developmental maladies, of which full use has been made. Some years ago the late Mr. Treacher Collins invited[1] his fellow ophthalmologists to regard retinitis pigmentosa not as the result of choroidal sclerosis but as an abiotrophy of the rods and cones with secondary involvement of the pigmentary epithelium. The term abiotrophy was introduced into general medicine by Gowers to connote the inherent low vitality of certain cells or systems of cells leading to early degeneration, and was lucidly explained by Mott in these words: "In contradistinction to normal senile decay are premature pathological processes of decay attacking groups, systems, or communities of neurons subserving special functions. . . . The neurons of a particular system die prematurely owing to an inherited or acquired want of durability. . . . ." The fact that retinitis pigmentosa is a familial disease in which heredity plays an important part is in favour of its being an inherited weakness innate in certain individuals and quite independent of inflammation or local vascular disease. Collins was able to show that advanced retinitis pigmentosa can exist without any serious involvement of the choroidal vessels. Mr. Arnold Sorsby has confirmed these findings and carried the conception of retinal abiotrophy further in a contribution to the recent ophthalmological congress. Another retinal disease which he finds best explained by the conception of abiotrophy is familial macular degeneration. Here the pigment is central, and day blindness, not night blindness, is the prominent symptom. It is suggested that whereas in retinitis pigmentosa the rods are first affected, in this other familial disease it is the macular cones that give way first. Collins called it "retinitis pigmentosa at the macula." It has been described as occurring at different periods of life in different families—congenital, juvenile, presenile. Some of these cases are purely retinal. Others are complicated by cerebral degeneration. In either case the onset of the condition in children previously healthy, its familial character, and its steady progress stamp it as an abiotrophic process. Little is known of the pathology of Leber's hereditary optic atrophy, but there is evidence that it commences as a primary degeneration affecting either the papillo-macular bundle or the ganglion cells of the macula. Its character as an hereditary disease suggests strongly that it belongs to the group of abiotrophies. Similar arguments are used by Mr. Sorsby to explain some rarer conditions such as the Tay-Sachs disease, which attacks infants of the Jewish race, and certain forms of choroidal atrophy. A schedule, reproduced in an earlier issue,[2] distinguishes between unassociated retinal abiotrophy and cases associated with disease of the brain as in the Tay-Sachs disease, or of the skin as in degeneration of the elastic fibres associated with angeoid streaks of the retina (Gronblad's syndrome), or of the skeleton as in an interesting family group discovered by himself. Here, mother and five out of seven children were affected; besides macular coloboma in both eyes, there were present absence of nails, especially on the index-fingers and big toes, stunting, and even absence of phalanges, and tendency to bifurcation of the terminal phalanges of the thumb and big toe. Retinitis pigmentosa itself is sometimes associated with incurable deafness or with mental defect, which, as Collins suggested, are probably also due to abiotrophy, which picks out tissues which have attained a high degree of specialisation.

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[4] Surg., Gyn., and Obst., March, 1934, p. 551.

[5] Human Biol., 1934, vi., 43.

[1] Trans. Ophth. Soc., 1919, xxxix., 165.

BIOLOGY IN THE SCHOOL CURRICULUM

A HEADMASTER of the old type used to say that if a boy was aware that he had either a body or a soul there was something the matter with him. The inference he intended to convey was that the physical and spiritual needs of his pupils were so well satisfied that they could disregard them and concentrate on other things. A hungry child is likely to become preoccupied with the needs of his body to the exclusion of everything else, and a child living in a state of unsatisfied curiosity is in a comparable condition. Biology is still given a casual reception in many schools, being lumped into the despised society of drawing and handicrafts. Miss B. D. Tyrrell, writing in the March issue of *Health and Empire*, has described a biology syllabus which has been followed for the last eight years in the Darlington Training College, a secondary school of over 600 girls. Sex instruction as such has no place in the scheme, and reproduction is emphasised no more strongly than any other vital function. The intention is, of course, that the children should regard reproduction as a natural and inevitable function like breathing—an excellent principle, but one which sometimes does not work out in practice. Children rarely use their powers of deduction except under the influence of a hint, and they can listen intelligently to information about stamens and gynæceums without observing any relevance to human reproduction. The syllabus outlined by Miss Tyrrell, if it is followed, is explicit on this subject as on others. It is allowed that on the whole the best girls work at classics, and finish their study of biology before they have touched zoology at all. Moreover, as she admits, few examiners expect a candidate to have covered the whole syllabus, so that much depends on the personal bias of the teacher. Before the age of about thirteen the girls receive instruction in general experimental science and chemistry only. For a year, while in the lower Vth, they are taught botany for one hour and twenty minutes per week. At the end of the year those who go on the classical side, "picked people on the whole," never study biology again unless they return to the science side in the VIth form. The aim is "to lay foundations of biological science by emphasising (*a*) interdependence of form and function, and (*b*) adaptation of form (expressing that function) to environment and to seasonal change." The chances of doing this during one hour and twenty minutes a week in the course of a single school year seem rather remote, but even a smattering of botany is better than no biology at all. The girls who go on the science side naturally have a greater chance of grasping these principles; they attend demonstrations of animal structure as seen in amœbæ, earthworms, butterflies, fish, and amphibia; in the upper Vth they study the anatomy of birds and mammals, and follow a revision course which emphasises the essential resemblances between plant and animal life. During their post-matriculation year opportunities are given for free discussion of evolution and elementary genetics. The syllabus aims at giving the children a general idea of vital functions. We must wish here that the time allotted to this part of education was more generous. But, considering that many schools devote no time at all to biology, we must commend a restricted course.

VETERINARY SCIENCE AND JOHN HUNTER

THE name of John Hunter is as much revered in the veterinary branch of medicine as on the human side; for the part he played, as one of the original founders of the Royal Veterinary College, was the stepping-stone of the veterinary science of to-day. The subject was recently brought before the Hunterian Society by Sir Frederick Hobday, the present dean of the college, in an address illustrated by means of lantern and cinema, embodying details of what has happened in the Camden Town school between its commencement in 1791 and the erection of the present day modern buildings, some of which (operating theatres and hospital for small animals) are already completed. Prof. Hobday prefaced his address by a tribute to the help which was given by certain members of the medical profession, mentioning especially the names of John Hunter, Drs. Clive, Baillie, Cruikshank, Home, Cooper, and Wilson, who opened their classes to the veterinary students who entered for their courses of study at the new institution. He paid special tribute to the keen powers of observation which John Hunter showed when writing upon certain lamenesses and other ailments of the horse, and drew particular attention to the classical surgical gland and other transplantation experiments which have now passed into the category of everyday operations in the routine of the modern veterinary consultant. His attention had been given to such equine ailments as "roaring" (due to paralysis of the left vocal cord) and "broken wind" (asthma) which he accurately differentiated in regard to their respective sources of origin; and his "Essays and

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[2] THE LANCET, April 21st, p. 849.

Observations." contain much which can be read with interest by those who see a future in the study of comparative medicine to-day. The lecturer, in conclusion, suggested the establishment of a branch of the Hunterian Society amongst the graduates and students of the Royal Veterinary College, stating that the veterinary profession owed a great deal to the memory of John Hunter "for the part he played in the start of its oldest veterinary college; and that, knowing the reputation he bore for thoroughness in all he did for the science he loved so well, it was a great calamity to our progress that he did not live at least some ten years longer."

In the remarks which followed the lecture, Dr. Bullock, the registrar and librarian of the Royal College of Veterinary Surgeons, gave interesting extracts from some unique books in the college library which bore tribute to John Hunter and the part he had played in the foundation of the veterinary profession.

AN EMPIRE DAY APPEAL

At the Mansion House meeting held in support of the British Empire Cancer Campaign on May 1st, the Duke of York who presided said the purpose of the meeting was to inaugurate an appeal on Empire Day, May 24th. He recalled the hope he had expressed ten years previously that the shadow of the great fear of cancer was slowly but surely lifting, although much remained to be done. The policy of the campaign all along had been not to husband its resources but to meet every reasonable call made upon it in aid of cancer research. Lord Horder, who proposed a vote of thanks, said he was sure that the solution of the problem of cancer would yield to careful observation and patient research. Sir Hilton Young remarked that cancer now took the second place in the list of fatal diseases and justified the campaign in its primary task of promoting and coördinating research on the causation of cancer. Prof. W. S. Lazarus-Barlow, vice-chairman of the investigation committee and chairman of the appeal committee, spoke of the change in the type of investigation during the 30 years in which he had been associated with cancer research; it must not be thought, he said, that the paths pursued for 30 years had proved fruitless. The extension of the criterion of success—namely, freedom from the disease—from three to ten years showed a sense of growing mastery over the enemy. The associations and affiliations of the campaign throughout the British Empire and its friendly relations with cancer research organisations abroad entitled the campaign to national and imperial support. It was announced that the King and Queen and other members of the Royal Family had sent donations to head the Empire Day list. In response to the Duke of York's words the appeal committee of the B.E.C.C. has arranged for appeals at 1000 centres on May 24th.

GASTROSCOPY

The flexible gastroscope which was recently described in these pages[1] has made its début in America, and E. B. Benedict has made a preliminary report[2] on its use in the Massachusetts General Hospital, where 75 gastroscopies have been smoothly carried out. The instrument is in routine employment in many German clinics, but little has yet been heard of it from other countries. The reason is probably a certain hesitation about its value in diagnosis. It is clear from the German experience that, in general, gastroscopy offers no advantage over radiography in the recognition of gastric ulcer and gastric carcinoma, and it is never likely to become as necessary as cystoscopy. On the other hand it enables inflammatory and atrophic changes in the gastric mucosa to be seen much more clearly than by even the best radiological technique, and chronic gastritis can therefore be defined with greater precision than heretofore. Since the pathogenesis of chronic gastritis may well be the key to the prevention of more serious conditions, a new method for its investigation is to be welcomed. Benedict's experience so far bears out the German claim that gastroscopy with the Wolf-Schindler flexible gastroscope is an "easy, harmless, and profitable procedure."

CHILD GUIDANCE IN AMERICA

Since 1922 when the Commonwealth Fund of New York first turned its attention to mental hygiene seven major child guidance clinics have been founded directly through its agency, and support has been given in this country (in the words of the fifteenth annual report) "to finance activities which are still too novel to command full support from the British public." The London Child Guidance Clinic, now in its fifth year, is still liberally supported by the Fund, although as a measure of economy the parent Institute for Child Guidance was closed last summer, after it had offered training during the six years of its existence to 32 psychiatrists, 15 psychologists, and 289 psychiatric social workers. It should be of interest to discover what form the child guidance movement is taking in the land of its origin, and in this we have the help of Dr. D. N. Hardcastle, who has reported[1] after spending three years studying clinics in America. The lines of approach and the goals of treatment he finds still in a state of flux, and wide variations in philosophy are evident; some clinics are content with a simple evaluation of their problems and are almost didactic in their therapy, others attempt to analyse all their material, whether parents or children. Asked "what is the potential position of the general medical practitioner with regard to the child guidance clinic, and can his services be utilised?" 10 out of 12 clinics referred to the general lack of psychiatric education, and the practitioner's inability to coöperate; 3 clinics thought that when adequately trained the practitioner should treat the bulk of the patients who now come to the clinic, and 2 considered that he could then coöperate in psychiatric treatment. Five replies reported close coöperation on the physical side only of the patient; only one speaks of all-round coöperation. Three clinics, however, enjoy the coöperation of children's specialists; one regards itself as in opposition to medical practice. To the question whether non-medical persons should be able to refer cases, 11 out of 12 clinics definitely said that they should; 2 of them refrained from treating cases so referred until the practitioner had been informed and his permission given. In another question Dr. Hardcastle embodied the criticism so often heard, that the child subjected to a team of people loses all chance of a personal psychiatric contact. Eight replies point out that the child has a much closer contact with the psychiatrist than he would have in any other form of medical treatment; the parents are not present, for they are seen by the psychiatric social worker. One detailed reply states that 55 per cent. of cases have dual attention, the psychiatrist treating the child and the social worker his environment; in 26 per cent. the social worker alone goes into the home and environmental conditions, and in 19 per cent. the psychiatrist works with the child direct. Another reply suggests that a child in a general hospital ward would come in contact with far more doctors and nurses than the two or three contacts it makes at the clinic; yet another cites the number of contacts which a child might make among police, probation officers, and others if it did not attend the clinic. On the subject of treatment, 10 clinics claim to use the technique which will best suit the child and to employ all available facilities to create a friendly feeling; full use is made of psycho-analytic knowledge, but analysis is not practised. One reply stresses the danger of the psycho-analytic approach and another says that a small group of selected children are undergoing analysis. This question was less productive of controversial thinking than any of the others; Dr. Hardcastle suggests as a reason for this that the technique of treatment is as yet little developed in the clinics. A postscript to the paper gives the views of the director of one of the clinics who read the replies. This psychiatrist claims that the progressive clinics have recently evolved a more flexible approach and a much freer attitude towards treatment, the responsibility for having it or not being put wherever possible on the parent.

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[1] The Lancet, 1933, ii., 813, 889.

[2] New Eng. Jour. Med., March 29th, 1934, p. 670.

[1] Brit. Jour. Med. Psych., 1933, xiii., 328.

TREATMENT OF SEXUAL OFFENDERS

THE problem of dealing adequately with persons who appear before the courts charged with sexual offences is as much a legal as a medical one. Mr. Claud Mullins, in a lecture before the Medico-Legal Society on April 26th, pointed out a few of the almost incredible anomalies in the law governing these offences. For instance, the exhibitionist must be dealt with under the Vagrants Act, 1824, along with persons who persistently tell fortunes and run away. Apart from the fact that he is more than a mere social nuisance and needs to be dealt with in a different manner, his offence may actually be much graver than other offences which happen to be regarded more severely. For instance, Mr. Mullins related two successive cases which he had tried on one day. In the first, an exhibitionist had shocked and insulted two small girls; in the second, two men were charged with gross indecency in a public convenience. Of the two offences the former seemed to be by far the more serious. Yet the second comes under the Criminal Law Amendment Act, 1885, and the offender must be committed for trial. The practical administration of the law was better than might have been expected. This particular exhibitionist, having 12 previous convictions, could be given six months, and a solution for the problem of the second case was provided by a convenient by-law of the London County Council imposing a fine of £5 or under for committing an act of indecency with another person.

As an example of the comparative severity with which the law visits various offences, Mr. Mullins remarked that stealing of any kind can be punished with five years' penal servitude, and if committed in a dwelling-house, with 14 years' penal servitude. Perjury is punishable with seven years' penal servitude. On the other hand, if a man detains a woman in a disorderly house against her will or commits an indecent assault upon a girl of 13, the maximum penalty is two years only. A woman who procures an abortion on herself may be sentenced to penal servitude for life, but the penalty for a man who has carnal knowledge of an idiot or a mental patient in hospital is only two years. The severity of the law towards what are known as unnatural offences is probably, he suggests, based on the religious horror which this conduct excited in the Middle Ages and which modern research has shown to be quite misplaced. The punishment is far greater than that awarded for incest, and juries, with a surer instinct for justice, have returned verdicts sometimes incomprehensibly favourable to the accused. Mr. Mullins is convinced that sexual offenders need something more than mere retributive punishment, but disbelieves in the customary dichotomy of punishment and treatment, holding that punishment is often a valuable therapeutic measure. In this opinion he is supported by such experienced psychiatrists as Dr. James Rees and Dr. J. A. Hadfield. Prison will, he thinks, remain indispensable for some offenders if only to prevent an outbreak of lynch law, though prison has not given encouraging results as shown by the figures for recurrence. He considers that an indeterminate sentence based on the progress of the offender in prison is more likely to produce good results than a sentence fixed by the court on unscientific grounds. As measures of reform he advocates that the large remand prisons should have medical psychologists on their staff, so that a report on the condition of an offender could be available between conviction and sentence; that the prison authorities should have a statutory right to report on any case between verdict and sentence whether the court desired a report or not; and that time should be given for inquiry and report in all cases before sentence is passed. Although flogging as a preliminary to and part of an extended period of training may possibly be defended, Mr. Mullins strongly condemns this punishment in conjunction with or as an alternative to imprisonment.

The only real solution of the problem will, he holds, be found in preventing the kind of people who become sexual offenders from ever being conceived. In addition, he suggests that the law should be altered to be less hard on abortion and homosexuality, and harder on the wanton spreading of venereal disease and the promiscuous begetting of children by delinquents and defectives.

AT a meeting of the Royal Society, on May 3rd, Prof. Otto Warburg was elected a foreign member. Prof. Warburg, whose work on cell metabolism won him the Nobel prize for medicine in 1931, is director of the Kaiser Wilhelm Institut für Zellphysiologie, at Dahlem, Berlin.

THE series of articles on Prognosis contributed by invitation will be resumed early in June, when publication of the five concluding lectures on the Preventive Aspects of Medicine at King's College has been completed.

ST. MARY'S HOSPITAL, PADDINGTON.—The Duke of York presided last week at a dinner in aid of the building fund of this hospital. A sum of £105,000 is to be raised for building a new nurses' home and a pay-block, and the Duke stated that an anonymous donor had undertaken to double every pound received up to £15,000. It was afterwards announced that the £15,000 had not only already been exceeded and the promised similar sum paid over, but that the anonymous benefactor had offered to double amounts received up to Christmas next to the extent of a further £25,000. The result would be that provided the stipulated sum was subscribed in full, the whole of the £105,000 would be available by the end of the year.

SPECIAL ARTICLES

MEDICINE AND THE LAW

Drunkenness as Defence to Charge of Arson

At Leeds assizes last week, when a man was being tried for setting fire to the furniture in his house, a defence of drunkenness for once succeeded. He pleaded that he was so "mad drunk" at the time as not to know the nature of his act. He had, he said, ordinarily been a total abstainer, but domestic irritations had caused him to break out. Mr. Justice Finlay gave the jury a characteristically careful and accurate explanation of the law and the accused was acquitted.

Normally, as is well known, voluntary drunkenness is no defence. The drinker, in Coke's quaint phrase, is *voluntarius dæmon*; he has no privilege by the surrender of his self-control; "what ill soever he doeth, his drunkenness doth aggravate it." There are, however, two aspects of intoxication of which the law takes a less unsympathetic notice. First, though drunkenness (like anger) is not an excuse for crime, it may sometimes affect the degree of guilt where a particular intention is essential to the commission of the crime. Just as circumstances of provocation may reduce murder to the lesser offence of manslaughter, so drunkenness may be taken into account in considering whether the accused formed a particular intent. Secondly, drunkenness, if it produces insanity, may be a successful defence, as the recent Leeds case shows. Here it will not be enough to show that the man's mind was affected by drink so that he more readily gave way to some violent passion; this will not rebut the ordinary presumption that everyone intends the natural consequences of his acts. To be a successful defence the drunkenness must be of such a degree as to cause incapacity of forming an intention to commit the particular crime. The locus classicus for the law is the decision of the Court of Criminal Appeal in Beard's case in 1920. There the accused had criminally assaulted a 13-year-old girl; in furtherance of the rape he placed his hand on her mouth and his thumb on her windpipe, thereby suffocating her. He was held guilty of murder in the absence of evidence of such a state of drunkenness as would negative the intent to commit the rape. The doctrine of criminal responsibility in relation to alcohol, it may be added, would apply equally if for alcoholic intoxication there were substituted mental or bodily conditions due to narcotic or stimulant drugs or their hypodermic injection.

Aplastic Anæmia: Inquest on Cellulose Sprayer

An inquest was held at Battersea last week upon the death of Charles Ingold, a cellulose sprayer's mate, aged 19, who was found to have died of aplastic anæmia. His mother said he was brought home from work on the Thursday before Easter with a temperature of 103°; there were mauve patches under his skin. He was taken to the St. James Hospital, Balham, and his two brothers gave blood transfusions, but he died on Easter Sunday. Dr. W. L. MacCormac, medical officer at the hospital, explained the effects of the disease at the inquest. On admission the young man's blood was found to have turned almost to water. Two days before death specimens of his blood showed only 100 white blood-cells as compared with the normal 6000. Ingold's employers, for whom he had worked since November, were represented at the inquest. Allusion was made to a secret formula used in the spray for lacquer work. It was admitted that one element in the formula was harmful, but it was claimed that ventilation made it normally innocuous. The air in the factory, it was said, was changed 40 times an hour though the Home Office suggested a minimum of 30 times. The formula was shown to the coroner (Dr. Edwin Smith) and to Sir Bernard Spilsbury who gave evidence. The latter observed that this was a rare occupational disease, possibly due to benzine poisoning; the cause of the disease was not established. Dr. Donald Hunter, research worker in anæmia at the London Hospital, stated that this form of degeneratory anæmia was often due to benzine poisoning in other countries, but in the United Kingdom, where factories were excellently ventilated, no such case due to benzine poisoning had come within his own experience. According to Dr. Hunter the cause of 95 per cent. of the cases of aplastic anæmia was unknown.

The formula was not disclosed. Had the coroner been satisfied by the technical evidence that the public interest required the full analysis and examination of what was claimed to be a trade secret, he would no doubt have insisted on public disclosure. It was agreed that the cellulose spray contained benzine. The normal ingredients of the lacquer employed in the factory were stated to be the same as those used elsewhere in other English factories of the kind; it was the solvent which was the secret.

PARIS

(FROM OUR OWN CORRESPONDENT)

GOODWILL AS A SALEABLE ASSET

Though French law does not in theory encourage the putting of a commercial value on the goodwill of a medical practice, holding that the confidence placed by a patient in his doctor is not an asset which can be priced in currency, there is a growing tendency for newcomers in a district to prefer the short-cut of a bought succession to the more laborious method known in the vernacular as squatting. The transaction between the incoming and outgoing possessor of a practice is often complicated by the transfer of a lease and medical and other fittings which are just as tangible as the goodwill of the patients is intangible and hypothetical. In a recent lawsuit, the purchaser of a practice disowned his signature to the deed of sale, pleading that he was free to cancel it as, according to the law, the confidence of the patients is no commercial commodity. While he lost his case, the situation with regard to the sale of a patient's goodwill is obscured rather than clarified: and the line separating the ethical from the unethical in this matter lacks definition. This is an additional reason for adhesion to a society whose technical advisers can pilot practitioners safely in these dangerous waters. The *Sou Médical* now has a membership exceeding 6000. There are five legal experts on its staff. The annual subscription is only 100 francs, and when an additional 50 francs are contributed as a subscription to the journal, *Le Concours Médical*, cover for half a million francs is provided in case of lawsuits. There are, of course, other concerns, not of a coöperative character, which do business in the same field. But the policies which they issue are apt to be worded with such forensic finesse that doctors may find it much easier to pay their subscriptions than to reap any benefit from them.

A DROP IN THE GOLD STANDARD

A recent discussion at the Société Médicale des Hôpitaux made it clear that the treatment of tuberculosis with gold has reached the negative phase which is apt to occur with all new treatments. With few remedies has the positive phase been so marked. For several years past gold treatment has been so popular that you had only to cough a little to qualify for it. The attack on it on this occasion was led by Prof. Emile Sergent, who referred to cases of gold poisoning he had seen in hospital and private practice as a sequel to the indiscriminating enthusiasm of his colleagues. As for the successes associated with it, he was inclined to suspect that the inherent tendency of tuberculous changes to retrogress had been—more or less unconsciously—exploited in favour of this last newcomer in the therapeutic field.

GOITRE

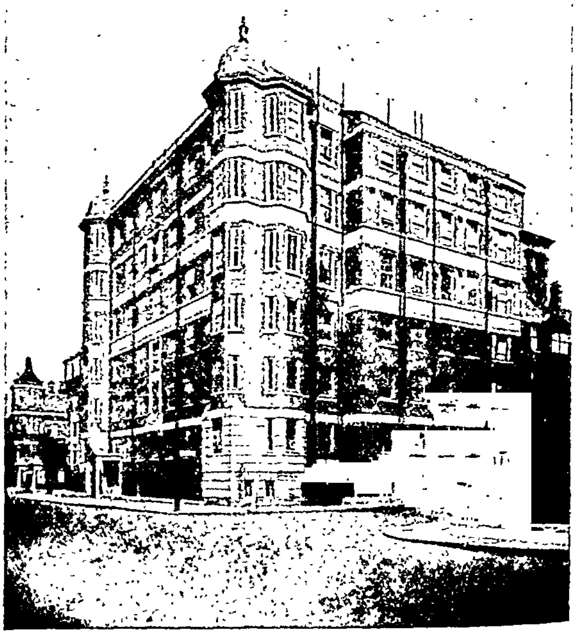
The tenth session of the Assises Nationales de Médecine Générale Française was devoted to a discussion of recent collective research into the nature of goitre. In many parts of this country goitre would seem to be on the wane, an improvement commonly attributed to better hygiene and, above all, to a better water-supply. In one area the diminution of goitre was associated with the introduction of sea fish and more meat in the dietary. In another area the influence of heredity was found to be so great that it was demonstrable on the distaff side in about 40 per cent. of all the goitres. While endemic simple goitre, when found in the large towns, would usually seem to be imported and not to have developed in them, the hyperthyreoses appeared, on the whole, to be more common in the towns than in the country (a difference less marked since 1918), and among the rich rather than the poor. Contributory factors are acute articular rheumatism, the infections of adolescence, typhoid fever and other water-borne diseases of the intestinal tract. In some areas hyperthyreosis is construed as a sign of resistance to tuberculosis; when the thyroid signs diminish, there is apt to be a recrudescence of an old pulmonary tuberculosis. While the advocacy of complete and prolonged rest in the early treatment of Graves's disease found little or no contradiction, opinions diverged on the merits of radiotherapy and operative treatment. The results of radiotherapy in 658 cases collected by Dr. J. Belot from various sources in Paris were very encouraging: failures 5 per cent., improvement in 25 per cent., recovery or great improvement in 70 per cent. Dr. H. Welti maintained that the results of thyroidectomy were superior, and that the claims made by the radiologists were not substantiated by surgeons who saw patients whom the radiologists had failed to cure. During the past five years he had performed 289 operations on 207 cases of exophthalmic goitre, with only one operative death. He had also operated on 167 goitres showing no signs of hyperthyroidism, and among them he had only two deaths to record. Another speaker tried to restore the balance by remarking that the radiologist is now beginning to see the operative failures of the surgeon. This was an interesting debate.

NEW RADIOLOGICAL DEPARTMENT AT THE CANCER HOSPITAL

ON Wednesday last H.M. the Queen opened the new buildings of the Cancer Hospital (Free) consisting of a private wing for paying patients, to be known as Granard House after the President of the Hospital, and of a new radiological department under the care of Prof. J. M. Woodburn Morison. The building also contains the new out-patient department which has long been badly needed. Our illustration shows the attractive frontage of the building on its corner site. The total cost of the new wing has been about £150,000.

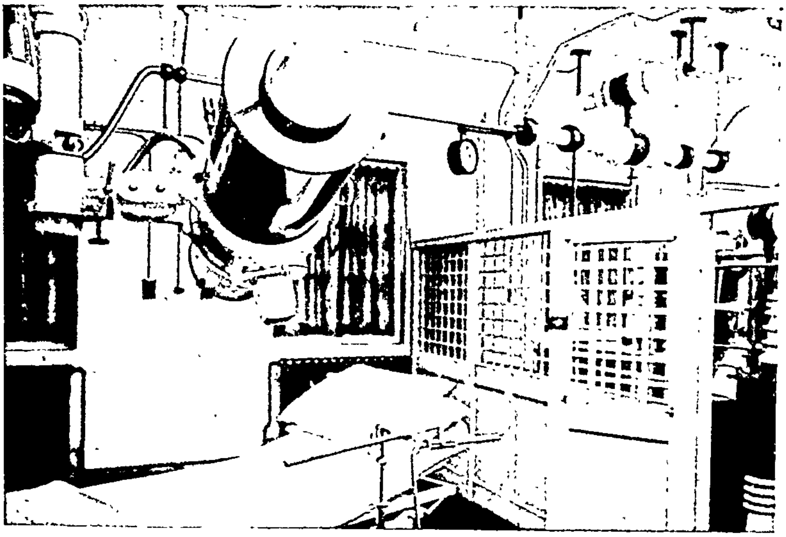
BEDS FOR PRIVATE PATIENTS

The first, second, and third floors of the building contain accommodation for 29 patients of limited means who can contribute towards the cost of their maintenance and treatment. The scale of maintenance fees, which has been approved by the Charity Commissioners, is 6 guineas per week in a single room, 5 guineas in a two-bedded, and 4 guineas in a three-bedded room. For radiological investigation the maximum charge is 5 guineas for a complete gastro-intestinal examination (exclusive of enema) with 3 guineas extra for an opaque enema; 3 guineas for examination of the urinary tract, with an additional fee for intravenous and retrograde pyelography; 2 guineas for investigation of the heart and lungs, or 3 guineas if stereoscopic films are taken; 1 guinea for investigation of either upper or lower extremity, or 2 guineas for a stereoscopic film of the shoulder. Other charges are in proportion. There is also a schedule of maximum charges for pathological examinations; the highest is 2 guineas chargeable for sugar-tolerance determination, preparation of autogenous vaccines, estimation of basal metabolic rate or histology of a frozen section taken at operation.



Profile of Granard House.

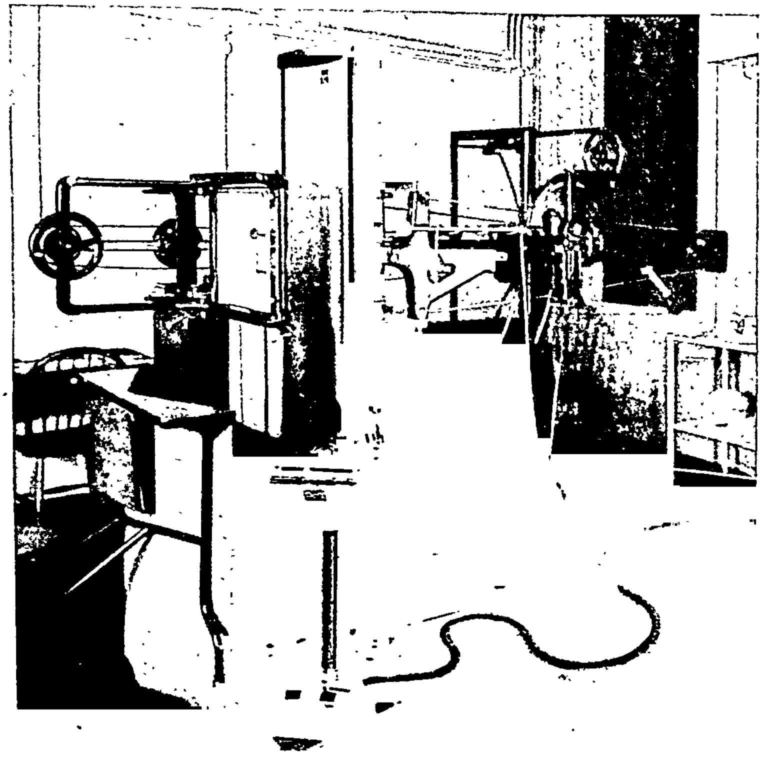
RADIOLOGICAL DEPARTMENT



Deep X ray therapy

This has been designed to secure the closest possible coöperation between clinical work on the one hand and scientific investigation on the other. Under the direction of the late Dr. Robert Knox the work of the department was found to be increasingly cramped for space and Prof. Woodburn Morison will now have three complete floors (fourth to sixth in the profile) under his direction. These are allotted to (1) physical investigations and the teaching of students, (2) X ray diagnostic work and radium treatment, (3) high voltage X ray therapy, artificial sunlight, and electrical treatment.

In association with the University of London and the Royal Colleges provision is made for post-graduate instruction of medical students in both clinical and scientific aspects of radiology. For this purpose a new lecture theatre and experimental laboratories are provided. Facilities are also available for the instruction of radiographers. The diagnostic section comprises rooms devoted to X ray investigation both by screening and by radiography, as well as the requisite dark-rooms, consulting- and dressing-rooms. We give an illustration of the arrangement of one of these rooms devoted to diagnosis. The high voltage X ray apparatus on the fifth floor (also illustrated) has been specially designed for the production of penetrating X rays. Special attention has been given to the protection of patient and operator and to the measurement of dosage. There is a wireless device by which the patient can speak to the operator some distance away.



Part of an X ray screening room

PHYSICS DEPARTMENT

This department, which is in charge of Mr. W. V. Mayneord, D.Sc., has been mainly concerned with the problems of X ray and radium dosage. When work was commenced, the only method of X ray dosage was with a barium platinocyanide pastille and a standard parallel plate was set up and calibrated in German r units before this was adopted internationally. Problems of distribution were next attacked, measurements in a phantom being made at 130 KV. pulsating potential, the maximum then available. Quite recently these measurements, with vastly improved apparatus, have been carried up to 400 KV., and demonstrate the striking improvement in depth dose and output now available.

The work on radium therapy has two aspects, theoretical and experimental. The distribution of radiation around various containers has been studied mathematically and experimentally, affording in many cases a fairly accurate idea of radiation fields. This work led to the design of surface applicators which give uniform irradiation, as well as charts enabling the correct amounts of radium in applicators of various sizes and various distances to be read off. Meanwhile, work has been done on the establishment of the r unit in gamma ray therapy, work which is now fairly complete. This should help in the standardisation and rationalisation of gamma ray therapy. Work has also been done on the variation of electron emission and possible sensitivity variations of tissues with wave-length, and some theoretical work is about to be published on the physical basis of biological action. Recently too the condenser dosimeter has been developed for both radium and X ray work, enabling both the quantity and quality of the radiation received in natural cavities of the body to be measured accurately.

Experimental work has also been carried out in conjunction with Prof. E. L. Kennaway on the optical properties of the carcinogenic hydrocarbons and allied substances. Biophysical problems are likely to be attacked in the future, now that means are available for measuring accurately and easily the various radiations used in clinical and experimental work.

Research in this department is financed chiefly by the hospital itself, but help is given by the British Empire Cancer Campaign, the Medical Research Council, and in certain directions by the International Cancer Research Foundation of Philadelphia.

"ACCREDITED MILK"

(FROM A CORRESPONDENT)

THE proposal of the Milk Marketing Board to add one more to the list of specially designated milks on the market will be received by the medical profession with rather mixed feelings. At the same time it is a highly important development and deserves detailed consideration, both on its merits and as an indicator of future developments in the long drawn out struggle for a clean safe milk-supply. It is a designated milk not sponsored by the Ministry of Health but introduced from the agricultural side, and those producers who comply with the requirements will be rewarded by receiving a bonus in the form of payment for their milk above the standard price given by the Milk Marketing Board, independent of their own exertions to sell the milk. The money will come out of the pool and is as such a contribution from all the milk producers. From this point of view it is wholly admirable, since the general effect must be to induce more and more producers to take the requisite steps to qualify for this additional payment and be placed on the roll of "Accredited Producers." Probably within a reasonably short time, a material proportion, even a majority, of the milk producers, will so qualify, and the whole standard of milk production will be raised and something which may fairly be called a clean milk-supply will be the general rule and not the exception. Put another way, those who do not conform to the new standard will be regarded as dis-credited milk producers, and it is not unreasonable to assume that as such their milk will be rejected for liquid consumption and they will have to be content with the much lower price payable for milk used for manufacturing purposes. Such no doubt is the laudable aim of the Milk Marketing Board, and their method of procedure is calculated to attain this object, using as it does the only practicable method to obtain a clean milk-supply, that of financial inducement.

But unfortunately, however, there is another side to the picture which induces considerable misgivings. To appreciate this aspect we have to consider the requirements necessary to be placed on the Roll of Accredited Producers. These are set out in the Report of the Reorganisation Commission for Milk (1933) and include :—

(*a*) The clinical inspection of herds and the elimination of diseased animals.

(*b*) The inspection of buildings to ensure compliance with a reasonable standard.

(*c*) The inspection of methods of producing and handling milk to secure compliance with a reasonable standard.

(*d*) The taking of, say, three surprise samples of milk over a period of three months and the satisfaction of a prescribed bacteriological standard.

Leaving out of consideration their indefinite nature and the considerable administrative problems involved, and assuming efficient control, it is obvious that at the best it is Grade A milk over again but with rather relaxed standards. And Grade A milk is fairly universally accepted as failing to give a safe milk-supply. It is well known that at least 40 per cent. of dairy cows are infected with tuberculosis, and it is notorious that clinical inspection will only eliminate a percentage of the infective animals, and a milk-supply free from tubercle bacilli cannot be guaranteed. The other three requirements refer to cleanliness of production. A cleanly produced milk-supply is highly desirable but merely a clean milk-supply is not a *safe* milk-supply. The risks of conveying to man tuberculosis, undulant fever, septic sore-throat, and the acute infectious diseases will be comparatively little reduced in the herds of accredited milk producers as compared with the ordinary producer. Stated briefly, the scheme of the Milk Marketing Board will materially assist in the production of a clean milk-supply but will do comparatively little to give a safe milk-supply, and it is a *safe* milk-supply which is insistently demanded by the medical profession.

The hope of the Milk Marketing Board that the new step will lead to an increased public confidence in the milk-supply with an added consumption is unlikely to be realised because an essential factor is lacking, the confidence and support of the medical profession. This can only be won by a *safe* as well as a *clean* milk-supply, and it is important to state this clearly. The proposal is one step in the right direction but not the only one and not even the essential step. In view of our infected herds and the impossibility of obtaining disease-free herds within a reasonable period, the only method available to give a safe milk-supply is efficient pasteurisation. A roll of accredited producers combined with pasteurisation of the milk supply would be a most valuable combination, but the Milk Marketing Board gives no sign that it appreciates this essential requirement. Without it the hope of a much larger consumption of liquid milk, which is so much needed both from the nutritional point of view and to help the milk producers, is likely to remain a hope unrealised. The medical profession wishes to help but it is unalterably opposed to anything short of a *safe* milk-supply.

One minor criticism may be mentioned. The name "accredited milk" is not a happy one. The expression "accredited" has become closely associated in U.S.A. and elsewhere, and is now being introduced into schemes in England and Scotland, for dairy herds which are accredited as free from tuberculosis. It is confusing to use the same term for milk supplied from herds which are not free from tuberculosis and which are not required to be so free. This expression "accredited" is firmly fixed in its usage for tuberculosis-free herds and should not be used with a quite different meaning. The nomenclature of designated milks is already confused and misleading and it is unfortunate that a fresh source of confusion is proposed to be introduced.

PUBLIC HEALTH

THE PRE-SCHOOL CHILD

A STUDY IN NUTRITION

So many of the measures adopted by health departments for safeguarding the health of children are founded either on general medical conceptions or the practice of other areas, that it is pleasing to notice an ad-hoc medical investigation leading up to concrete proposals. An enquiry into the physical condition of children between one and five years of age, in relation to their environment and social circumstances, has been conducted for Newcastle City Council by Dr. J. C. Spence, and it forms the text of a report [1] by the medical officer of health, Dr. J. A. Charles, on the social and administrative shortcomings which conduce to the state of affairs revealed. Three groups of poorer class children, totalling 125, and belonging in 113 instances to families where the breadwinner was unemployed, were submitted to careful medical scrutiny, their medical histories studied, and their home conditions investigated. The families chosen were regarded as fair samples of the class patronising clinics and similar social institutions. At the present time these inevitably include a large proportion of unemployed. As controls 124 children of the professional or well-to-do commercial class were examined by Dr. Spence. The numbers are admittedly small, but thorough clinical examination of the children by one examiner, or under his direction, was thought to be more reliable than an analysis of more numerous records compiled by a number of independent clinicians, and the time available placed a restriction upon the number of observations. In the first instance the children were classified from inspection under broad descriptions of the usual kind—good and satisfactory general condition, poor and unsatisfactory general condition and remainder. Inevitably this grouping was found to be deceptive in many instances in the light of more thorough clinical examination. This examination was directed specially to the following points—viz., height and weight, past or present rickets, anæmia, deficiency diseases and past illnesses.

Charts illustrating the distribution of heights and weights of the "professional families" class and the "labouring and artisan families" class are illuminating. Dr. Spence has adopted zones of heights and weights for each age as representing the normal ranges, and rightly describes these as constituting a modest standard. Stated briefly in figures, the charts show that 25 per cent. of the professional class children were above and only 5 per cent. below the standard heights, while less than 2 per cent. of the poorer class were above them and 47 per cent. below. As to weights, 48 per cent. of the better class children were above standard and 13 below, as against corresponding percentages of 11 and 55 among the poor. In the search for signs of rickets, Dr. Spence's past work [2] has convinced him that X ray examination is essential, and 103 children were so examined after suspicion had been aroused by clinical tests. In only 5 cases was there evidence of active disease. In the pursuit of anæmia, hæmoglobin values over 75 per cent. were accepted as satisfactory and under 65 per cent. as definite evidence of the disease. Among 25 of the better class children, taken as controls, 21 gave hæmoglobin readings above 75 per cent. and none below 70 per cent. On the other hand, of 121 of the poorer children, only 24, or 20 per cent., had hæmoglobin values over 75 per cent., and 28, or 23 per cent., were definitely anæmic. There was a notable absence of other signs of deficiency disease. Enquiry into the history of illnesses revealed a significant difference between good and poor class children. Of the former, only 5 out of 124 had suffered from pneumonia or pleurisy or chronic or recurrent cough, compared with 49 of the 125 poor children. Bringing together all his observations, Dr. Spence found that out of 125 poor children 45 (36 per cent.) were unhealthy or unfit and in 20 of these cases he considered that preceding illness was the starting-point of the unfitness; in the other 25 he could find no cause but improper or inadequate diet. As regards housing, he found that 27 poor children whom he was able to accept as healthy were living in houses with an average occupancy of 1·7 persons per room, while the 45 unhealthy were in more congested homes with an average of 2·6 persons per room. His conclusions are that the physical unfitness, giving rise to an appearance of malnutrition among 36 per cent. of poor children, is preventable, since the condition is much less frequent among the well-to-do; that the main immediate cause is physical damage by infective disease; and that the main factors which promote and perpetuate it are overcrowding in houses and insufficient diet. The relative importance of housing and dietary he suggests as a subject for a much larger enquiry, and it is clear from recent medical and political controversies that there is need for definite knowledge on such matters.

In commenting on the findings of Dr. Spence, Dr. Charles points to the heavier and earlier incidence of measles and its consequent influence upon mortality and chronic catarrhal disease in the more congested areas of the city. He shows that the results of this minute enquiry are in correspondence with the general findings among school entrants. In Newcastle it has been found that, among a small recent sample of the unemployed, the weekly expenditure on food averaged 4*s.* 5·8*d.* per man value, and at the prices reigning at that time a minimum adequate dietary would have cost 5*s.* 7½*d.* on the B.M.A. Committee's standard, or 5*s.* 1½*d.* on that of the Committee on Nutrition of the Ministry of Health. Consequently, he urges again the need for a forward policy in housing, increased hospital provision for measles and whooping-cough, more liberality in the assistance of the unemployed, and wider application of those measures for the care of "toddlers" which maternity and child welfare and education committees are permitted to take.

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[1] Investigation into the Health and Nutrition of certain of the Children of Newcastle-upon-Tyne between the Ages of One and Five Years. By J. C. Spence, M.D., F.R.C.P., with observations by J. A. Charles, M.D., M.R.C.P., D.P.H.

[2] THE LANCET, 1933, ii., 911.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED APRIL 28TH, 1934

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 9 (last week 3); scarlet fever, 2742; diphtheria, 1122; enteric fever, 31; acute pneumonia (primary or influenzal), 1163; puerperal fever, 36; puerperal pyrexia, 114; cerebro-spinal fever, 36; acute poliomyelitis, 6; acute polio-encephalitis, 1; encephalitis lethargica, 15; dysentery, 32; ophthalmia neonatorum, 100. No case of cholera, plague or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on May 7th–8th was as follows: Small-pox, 8 under treatment, 0 under observation (last week 11 and 0 respectively); scarlet fever, 1598; diphtheria, 1657; measles, 2857 (last week 3171); whooping-cough, 303; puerperal fever, 38 mothers (plus 14 babies); [illegible] 258; poliomyelitis, 2; "other diseases," [illegible] Hospital there were 15 babies (plus 6 m[illegible] neonatorum.

Deaths.—In 118 great towns, including London, there was no death from small-pox or enteric fever, 103 (46) from measles, 6 (1) from scarlet fever, 36 (6) from whooping-cough, 53 (12) from diphtheria, 49 (13) from diarrhœa and enteritis under two years, and 81 (17) from influenza. The figures in parentheses are those for London itself.

Measles is still diminishing, although this week there were 10 fatal cases in Liverpool and 6 in Newcastle-on-Tyne. Whooping-cough also caused 10 deaths in Liverpool and 5 in Birmingham. Fatal cases of influenza were chiefly confined to the northern and midland areas: Manchester reported 6 deaths, Leeds and Liverpool each 4; Birmingham reported 9 deaths and Newcastle-under-Lyme 3. Six fatal cases of diphtheria occurred at Manchester. Five fatal cases of diphtheria occurred at Liverpool, no more than 2 elsewhere.

The number of stillbirths notified during the week was 282 (corresponding to a rate of 41 per 1000 total births), including 47 in London.

PANEL AND CONTRACT PRACTICE

An Apology for Rules and Regulations

In an interesting essay on health insurance in England, contributed by Sir Henry Brackenbury to a New England journal (New Eng. Jour. Med., April 19th, p. 851), is a frank admission of disquieting features in the scheme. The drawback most commonly mentioned is the multiplicity of rules and regulations about medical benefit. No doubt, Sir Henry says, there is a tendency to multiply and complicate these unnecessarily, but he assures his readers that most of them "arise from three extremely valuable, and probably unique, features embodied in the English system." These are:—

(1) Every registered medical practitioner has the *right* to be a member of the service unless and until it is proved that, because of misconduct, his continuance therein is detrimental to the service as a whole;

(2) The close approximation of the conditions of the service as between doctor and patient to those which obtain in private practice;

(3) The considerable share assigned to the profession itself in administration.

It is because of, not in spite of, the confidence in the profession which these features disclose, Sir Henry Brackenbury writes, that provision has to be made for the occasional delinquent. If the state has no right to choose which physician shall take part in the service, machinery has to be established for dealing with anyone who conspicuously fails in his duty. If the state has limited its function to bringing together doctor and patient, leaving them free thereafter to act in accordance with recognised or traditional methods, it must provide means whereby, in case of dispute, each may have a square deal. If the state leaves purely medical matters to be judged by a purely professional body, there must be some authoritative delimitation of the respective spheres and some prescribed means for action. All these statutory requirements, rules, and regulations, need not, he concludes, trouble the physician any more than the ordinary requirements of the penal code trouble the law-abiding citizen. In fact, they do not worry him overmuch; they exist largely for his own protection. There is, however, a certain type of mind which tends to be distracted by them, and therefore they should be made as simple and few as possible.

Contract Fees for Specialists

A report upon hospital and nursing-home schemes, issued by the executive committee of the National Association of Local Government Officers, suggests that specialist surgeons and physicians should reduce their fees to members of the Association. The committee was asked to devise some scheme to help such of their members and dependants as are at present outside the existing hospital aid societies. The only self-supporting scheme on an insurance basis likely to meet their needs is discovered in the Hospital Provident Association (associated with the Manchester and Salford Medical Charities Fund) under which free service—in voluntary hospitals, public health hospitals, or private nursing-homes—is offered to members with an income up to £600 per year, and grants in aid are made to those above this limit. The liability of the H.P.A. is limited to 40 guineas in any one year, no assistance being given for home medical treatment, or in cases of tuberculosis, maternity, mental, and certain infectious diseases. It is stated that this Association—

> "has made arrangements with a large number of hospitals . . . whereby up to a certain number of beds, cases for the Hospital Provident Association could be admitted at an agreed rate of 10 guineas a week, 5 guineas of which was for the hospital charges and the other 5 guineas placed in a hospital suspense account of the hospital out of which fees for surgeons, anæsthetics, &c. were paid. By this method patients could obtain their treatment more cheaply than if they went into a hospital where they paid probably a less amount for the residence and a greater amount for the operation. In other words, in a hospital under agreement with the Hospital Provident Association a person could have treatment and an operation of almost any magnitude or cost at the 'all-in' charge of 10 guineas a week."

It seems that under this scheme patients who could afford reasonable specialist fees—as they should be able to do if their income is approaching £600 a year—are getting specialist services at an improperly low rate. Operations are matters often of life and death; they should be considered to be capital charges and not such as have to be met out of an annual income. If a patient buys a house he does not say "I cannot pay £900 for it as my income is under £500 per year." It is a question whether the specialists on the staff of these hospitals "in the north-western districts" should not protest against the exploitation of their services by boards of management. Specialists and others give their services to hospitals to treat the poor of the community who cannot pay their ordinary fees. There is no reason why those who can afford to pay specialist fees should not cover their liability by some form of insurance, but that is a different thing from asking a specialist to share 15 guineas with an anæsthetist for an operation requiring three weeks stay in hospital.

MEDICAL EXHIBITION CENTRE.—The third floor and the basement of British Industries House, near Marble Arch, are to be devoted to a medical exhibition centre which will be run under the guidance of an advisory committee whose chairman is Dr. Alfred Cox (see THE LANCET, Feb. 10th, p. 310). The centre will be officially opened on July 18th.

CORRESPONDENCE

TESTS FOR MOTOR DRIVERS

To the Editor of THE LANCET

SIR,—In answer to Dr. Howard Mummery I would point out (as I stated in my letter to the *Times*, April 23rd) that the National Institute of Industrial Psychology has in fact evolved a shorter series of tests than that described by your representative. I have had an interview with the director subsequent to my letter and have his authority for making some further statements. The psycho-physical test should come first, as by that test it may be demonstrated that the applicant is totally unfit to drive, in which event the training should be no longer continued. This would save persons who are obviously unfit from being put to the expense and trouble of a quite useless training. The part of the programme at present in operation at the institute which it would be desirable or necessary to keep might be summed up under the following headings : (1) vision, (2) reaction time, (3) judgment of speeds, (4) judgment of distances, (5) resistance to distraction, (6) vigilance.

The technique of applying these tests could be learned by a man of average intelligence, with driving experience, within a fortnight, and the institute would undertake to select and train such persons. The cost of training of these prospective administrators of these psychophysical tests would be about £3 3*s.* for each, and the provision of apparatus for each centre roughly £60. Candidates might be tested in groups of six or even more, and the duration of the test might be shortened to 30 minutes. If the fee paid to each teacher for the tests were, say, £2 2*s.* an hour, the cost to the individual candidate would be quite small, well within the fee of 10*s.* now suggested in the Road Traffic Bill.

It will be noted that examinations of general medical fitness are not in the category of tests. It is obvious that no layman could be entrusted with a medical examination, but it is probable that the tests as described would reveal any gross disability, and attention would be thus directed to the necessity of a professional medical examination. To require a medical examination in all cases would entail so heavy an expense and so often be unnecessary that it would clearly be an impractical policy to press its enforcement upon all candidates to drive.

It will also be noted that the test of " confidence and general road behaviour in driving a model car through moving scenery," cited in my letter to the *Times*, has been omitted. The experience of nausea felt by your representative and by Dr. Mummery throws some doubt upon the value of this particular test, and a trial upon the road itself would probably meet with more support from public opinion. It happens also that the apparatus used at the institute in the performance of this test is the only really expensive item. I have consequently omitted this in the motion I have tabled (a copy of which I enclose herewith) for considering this subject in Committee, and I propose that the psychophysical tests as mentioned above shall be used in combination with a test upon the road itself of confidence and general road sense.

In conclusion, may I express my warm thanks for the support which you give to my plea to " enlist the help of the industrial psychologist in planning tests suitable for mass application."

I am, Sir, yours faithfully,

House of Commons, May 7th. E. GRAHAM-LITTLE.

THE SCOPE OF PSYCHOTHERAPY

To the Editor of THE LANCET

SIR,—As director of the Institute of Medical Psychology I am grateful for your annotation under this heading last week. Not only the physicians of this institute but all other psychotherapists of experience will agree with your two special points of emphasis. It is certain that the early treatment of " nervous " disorders must involve child psychiatry (a name that really is preferable to child guidance). It is equally true that increasing experience should lead us to better diagnosis so that the lengthy and costly methods of analytic treatment shall only be employed for those who are likely to respond adequately. We, here, have for long been attempting to achieve this state of affairs, and certainly we have always recognised " that a flair for the sympathetic handling of patients is not always combined in one and the same person with the ability and the experience that are necessary for competent diagnosis." Every patient who is sent by his doctor to the institute has two interviews, of approximately an hour each, for the purpose of diagnosis, one of which is purely physical and the other from the psychiatric angle. These interviews are carried out only by the senior and most experienced members of the staff. As a matter of fact approximately one in four of the patients referred here as suitable is turned down by the examining physicians.

It is more than doubtful, however, whether any clinician, in whatever branch of medicine his interests may lie, would agree with your suggestion that, in order to limit a waiting-list, only those patients who were capable of complete " cure " should be treated, and those with conditions capable of alleviation be excluded. You selected your figures from the institute's last report to back your argument. Might it not have been more relevant to say that though the physicians' estimates of improvement on discharge were conservative, in that particular group of ex-patients, after three years 31·1 per cent. reported themselves cured, while a further 30·3 per cent. reported improvement (*more than slight*) maintained ? Including this particular group of cases, the results of the follow-up of all ex-patients (averaged) shows that 33·5 per cent. are " cured " and the total of " cured " and " improvement maintained " together is 69 per cent. The proportion of patients who are not helped or who relapse is 16·5 per cent. This list does not compare unfavourably with figures of the other branches of medicine, and surely speaks quite well for the diagnostic skill that is shown in selection of patients.

The staff of this institute certainly welcome your criticism and your suggestion, but, from the point of view of those who are seriously concerned with the scope of psychotherapy, I think these further figures should be mentioned.

I am, Sir, yours faithfully,

May 7th. J. R. REES.

THE REGISTRATION OF OSTEOPATHS

To the Editor of THE LANCET

SIR,—Sir Ernest Graham-Little has reminded us that the Osteopaths' Registration Bill is now before Parliament, and I think that medical men at least should be acquainted with the truth about this movement.

In the first place, osteopathy has nothing whatever to do with "bone setting" or with manipulative surgery or the therapeutic manipulation of stiff joints. Manipulative surgery is now a recognised branch of orthodox surgical practice based upon sound pathological principles. Osteopathy was started little more than 50 years ago by a certain Dr. A. T. Still of Chicago, who enunciated the principle that "the law of the artery is supreme," and taught that practically all diseases are due to pressure upon the blood-vessels in the intervertebral foramina, brought about by (imaginary) displacements or "lesions" of the vertebræ. About 20 years later a man named Palmer, of Davenport, Iowa, announced that he had made the "discovery" that 95 per cent. of all diseases are due to pressure upon the nerves in the intervertebral foramina, brought about by the same (imaginary) displacements of the vertebræ. He enunciated the principle that "the law of the nerve is supreme," and he founded a school of chiropractic in opposition to the school of osteopathy previously founded by Still. The essence of both these doctrines is the treatment of *remote* diseases by the manipulation or "adjustment" of the imaginary spinal lesions which are supposed to be their cause.

These rival factions (to mention only two) have flourished exceedingly in the United States of America. But they have almost exhausted the field of credulity in that country, and they are now making the most strenuous efforts to secure a status which would enable them the better to exploit the resources of this country. It should be clearly understood that this is an American stunt; the British element in osteopathy is practically negligible. A few osteopaths have taken medical degrees, which means that they have had some sort of education, and it is remarkable that these men have at once discarded the cardinal doctrines of osteopathy and chiropractic, because they are obviously impossible. They have however substituted yet another doctrine, namely "congestion," due to the same imaginary displacements of the spine. This doctrine, of course, is equally fallacious but rather more subtle, because more difficult to disprove.

Enough has been said to show that these factions are not agreed among themselves as to which particular lie shall be put across the public as a cloak for empirical manipulation of the spine, and it will be interesting to see whether our enlightened legislators decide to give their official blessing to "the law of the artery" or to "the law of the nerve" or to all and sundry of these quack manipulators. It has been naïvely suggested that osteopaths do not require the full training of the medical curriculum to fit them for the practice of their art. One answer to this is that the last issue of an osteopathic journal that came into my hands was concerned entirely with the treatment of cancer of the uterus.

I am, Sir, yours faithfully,

London, W., May 7th. A. S. BLUNDELL BANKART.

To the Editor of THE LANCET

SIR,—Opposition from Sir E. Graham-Little, M.P., to the recognition and legal regulation of osteopathy has been so persistent that it does not surprise me to learn that he has put down a motion for the rejection of the Bill which Mr. Robert Boothby introduced into the House of Commons. It is surprising, however, that Sir E. Graham-Little should continue to use against the Bill arguments which have been more than once refuted. May I, as an osteopath, state the position as we see it?

As the law stands, any person can offer to diagnose and treat disease. There is nothing to prevent an unqualified person setting up in practice as a healer, provided that he does not use any title or description which suggests that he is a registered medical man possessing certain academic degrees which in fact he does not possess. I am, as an osteopath, as much opposed as Sir E. Graham-Little is, to exploitation of the public by unqualified practitioners, and I have taken an active part in promoting the Bill now before Parliament, with the object of prohibiting the practice of osteopathy by persons who are not in possession of the registrable qualifications prescribed and defined in the Bill. Apparently he does not yet realise that his opposition to the Bill is calculated to leave unremedied the scandal of unqualified practice. The organised osteopaths in this country are trying to close the door against the unqualified practitioner in their field of work. He is content to leave it open, not only as far as osteopathy is concerned, but generally as regards the healing arts.

I seriously doubt whether his attitude commands the assent of the medical profession as a whole. Even if it does, I am not without hope that Parliament will deal sympathetically with a Bill which simply lays down the principle that osteopathy shall be practised in this country by qualified persons and not by those who are unqualified.

Sir E. Graham-Little's letter leads to his now familiar conclusion that all the trouble between registered and non-registered categories of medical practice can be settled by the simple expedient of compelling everybody to qualify as medical men and allowing those who wish to specialise—in manipulative therapeutics, for instance—to do so by post-graduate study. This is no remedy at all for the scandal of unqualified practice, unless he proposes also to prohibit practice by non-registered persons. Does he propose this? I have not yet elicited a plain answer to this question—but it cuts, I submit, at the root of Sir E. Graham-Little's objection to our Bill.

I am, Sir, yours faithfully,
WILFRID A. STREETER,
Hon. Director, Osteopathic Defence League.
London, W., May 7th.

** That treatment ought to be rendered only by those who are, through training and examination, found to be fitted all will agree, but it does not follow as the hon. director of the Osteopathic Defence League presumes that medical men desire professional recognition for osteopaths. Osteopathy, as Mr. Bankart points out, is not manipulative surgery, but a system of therapeutics; and treatment given under this system has no scientific foundation.—ED. L.

THE DOSAGE OF ŒSTRIN

To the Editor of THE LANCET

SIR,—Recent work on substitution therapy by œstrin in castrated animals shows that enormous doses of 500,000 to 1,000,000 international units are required to replace completely the œstrogenic function of the ovary in a castrated woman. Prof. Dodds, in his Goulstonian lecture, published in your last issue, considers that smaller doses are and must be valueless in clinical medicine, and claims the support of most gynæcologists for this view. Many women, however, suffer from slight degrees of ovarian deficiency, and quite small doses of œstrin may well be effective in them, which would be valueless in a castrated baboon. I. F. Stein and M. L. Leventhal (Jour. Amer. Med. Assoc., 1932, xcviii., 621) record that out of ten women treated for amenorrhœa by the injection of 100 mouse units of œstrin, five became pregnant. Dr. Gardiner-Hill has reported (see THE LANCET, 1932, i., 188) on two patients with amenorrhœa and sterility who were given an injection of 180 and 200 mouse units respectively; both menstruated and both became pregnant.

In this connexion the following brief record of three cases in which pregnancy followed the oral administration of Progynon, a follicular hormone, may be of interest.

CASE 1.—Healthy woman, aged 27. Married for four and a half years; contraceptives never used. Consulted me for sterility in 1930. She gave a history of scanty menstruation, of short duration, and with a five weeks' interval ever since adolescence. Sexually cool. Pelvic organs normal. The only treatment given was one progynon dragée of 250 mouse units daily. After one month's treatment the period was only two days over the normal four weeks. After two months' treatment the interval was four weeks exactly. After three months' treatment pregnancy occurred. Parturition had to be induced owing to delay, and a Cæsarean section became necessary owing to some obscure abnormality of the muscular contractions of the uterus, and acute dilatation of the stomach subsequently occurred. The Aschheim-Zondek reaction was negative at four months.

CASE 2.—Married woman, aged 28, with one child aged 7. No contraceptives used for two and a half years. Desired a second child. This woman gave no history suggesting any ovarian deficiency, normal sexually, and the periods regular and normal. She was given one dragée of progynon of 150 mouse units daily for 16 days, after which pregnancy resulted and terminated normally.

CASE 3.—Healthy woman, aged 36. Married nine years. No contraceptives used for three years. Consulted me for sterility. She gave a history of periods of short duration and slight loss, though regular in time, since adolescence. Sexually frigid. Treatment: one dragée of progynon of 150 mouse units daily for two months. During the third month two dragées were given daily. Pregnancy occurred at the end of the third month of treatment, and is proceeding normally. The Aschheim-Zondek reaction was reported as a "weak positive" at four and a half months. The œstrin content was within normal limits.

It is difficult to believe that the occurrence of pregnancy in these cases was either a coincidence only or the result of suggestion. Dr. Gardiner-Hill has suggested that such clinical results as these might be explainable on the "trigger" hypothesis of W. Shaw—a small dose stimulating a subfunctioning follicular apparatus to produce active follicles and so initiating the cycle which ultimately results in normal menstruation and pregnancy.

There is some evidence that a slight degree of anterior pituitary hypofunction also existed in two of my cases. I have treated one case of sterility on the above lines without success.

I am, Sir, yours faithfully,

Bridlington, May 5th. P. D. H. CHAPMAN.

BLOOD TRANSFUSION IN GASTRIC HÆMORRHAGE

To the Editor of THE LANCET

SIR,—Referring to Dr. Aitken's article in your issue of April 21st, I wondered if your readers would be interested in the blood-pressure findings in a series of cases investigated along lines similar though not so exhaustive as his. In 10 cases of hæmorrhage (5 of gastric or duodenal ulcer, 3 of pernicious anæmia, 1 of carcinoma of the stomach, and 1 of reactionary hæmorrhage) I took the systolic and diastolic blood pressure before, during, and ½, 1, 2, and 4 hours after transfusion. The transfusions were given by the Joubet syringe in 5 cases and with a Rotunda syringe using citrated blood in the remainder. The object of the investigation was to test the theory that a blood transfusion increases blood pressure, thus predisposing to further hæmorrhage. Far from this being the case, the effect noted in all these cases was a slight lowering of the systolic pressure during the transfusion and subsequently a pressure not significantly different from the initial readings except in one case where there was a drop from 150 to 120 mm. Hg.

In all 10 cases the transfusion was called for as an emergency method of treatment and 7 of the patients recovered and went home. Of the 3 who died, 1 had gastric ulcer, 1 pernicious anæmia, and 1 aplastic anæmia. The patient with carcinoma did not die until some time later. The series was a small one, but taken in conjunction with subsequent cases in which blood transfusion was *not followed by further* hæmorrhage, it suggests that the hypothesis that blood transfusion raises the blood pressure requires further inquiry.—I am, Sir, yours faithfully,

Radcliffe-on-Trent, Notts, May 2nd. H. A. PALMER.

PSYCHOLOGICAL MEDICINE AT THE NEW POST-GRADUATE SCHOOL

To the Editor of THE LANCET

SIR,—May I be allowed to reply briefly to Dr. Yellowlees's helpful letter in your last number, though I certainly cannot suggest, still less announce, any formal expression of policy on the part of the new school?

No courses have yet been arranged—indeed, Friday, May 4th, was the last date for applications for the four professorships. It is clear that, until these chief appointments have been made, no final decisions as to the remainder of the staff, or as to the character and duration of the courses to be provided, can be made.

Dr. Yellowlees may, I think, rest assured that the school, in appointing its teaching staff and in arranging for courses, will have before its notice the claims of psychological medicine and other subjects mentioned in the *Athlone Report of 1921*. Let me add that the school would welcome any suggestions, or indications of the desires of medical practitioners as to the courses to be provided.—I am, Sir, yours faithfully,

M. H. MACKEITH, D.M., M.R.C.P.,
Dean of the British Post-Graduate Medical School.
London, May 8th.

AN EARLY CASE OF X RAY DERMATITIS

To the Editor of THE LANCET

SIR,—About 1893 my brother, the late Dr. R. S. Nichol, of Manchester, was the victim in a revolver accident and received a bullet which lodged between the liver and the lung. The surgeons of that period had little or no experience of gunshot wounds, so it was wisely decided that, provided no bad results ensued, it would not be advisable to probe or essay an extraction of the bullet. The weapon was somewhat less than 0·320 in calibre and fired a lead bullet. Had it been a modern automatic with a nickel jacketed bullet and a powerful charge it is probable that the missile would have gone clean through the body without parking itself for future observation.

In 1895 came the news of the discovery of X rays and experiments were being carried out everywhere. By this time my brother was a medical student at the Victoria University, and hearing of the investigations then being made in the physics department, under the direction of Prof. Arthur Schuster, offered himself as a subject. Between 2 and 5 P.M. one afternoon he lay on a photographic plate, under a Crookes' tube, and took the prolonged and unbroken exposure. Unfortunately, good technique had not then been attained, and I think the attempt must have been futile as I do not remember hearing of any satisfactory photographic result. There was however a sequel to this exposure, for about ten days afterwards my brother showed me his chest and asked my opinion. I noticed a round discoloured patch about 8 inches in diameter, with the bullet wound as centre, very similar to a sunburn, or what we now see after an overdose of ultra-violet rays. The only conclusion I could come to was that the condition was directly due to the action of the X rays, and I urged my brother to make the discovery known. This he never did, and it was not until some time later that a similar phenomenon was observed and recorded. Perhaps one of your readers can tell me the first recorded case of X ray dermatitis.

My brother died in the Manchester Royal Infirmary in 1927, having never suffered any ill-effects from the embedded bullet.—I am, Sir, yours faithfully,

J. O. NICHOL, B.Sc., A.M.I.E.E.

Manchester, May 3rd.

A DISCLAIMER

To the Editor of THE LANCET

SIR,—In view of the publicity given in the press to my informal talk to the Ladies' Association of Queen Charlotte's Hospital, I should like to make it clear that I did not know that reporters were to be present, nor did I know that the proceedings were to be published.—I am, Sir, yours faithfully,

Harley-street, W., May 7th. LOUIS CARNAC RIVETT.

THE SELENIDE TREATMENT OF CANCER

Dr. A. T. TODD writes to point out that the annotation on p. 963 of our last issue gives too pessimistic an account of his results in the treatment of cancer. In particular the statement that ten of the patients described as apparent cures are alive "more than a year after the beginning of treatment" requires revision. The duration of the "apparent cures" is calculated, he informs us, from the *end* of treatment (which lasts at least a year) to the month of October, 1933, when his paper was compiled. At least 19 months, therefore, has now to be added to the duration of these "apparent cures" in order to obtain the period of survival as ordinarily reckoned; and on this it is seen that 7 out of 15 are alive and free from symptoms three years or more after their treatment began, while the other 8 have all survived more than two years. Publication of the figures has been delayed, Dr. Todd says, until it was likely that the results were reasonably permanent. He adds in conclusion: "Though I only accept what are called scrap-heap cases, there is no reason why the method should not be applied to current surgical practice. If my results in my cases are what is given, what is likely to follow the application of the method to cases after presumed complete operation?"

VACCINATION: THE MODERN VIEW

A LETTER from Colonel W. G. King, I.M.S. retd., and Major Myer Coplans, late R.A.M.C. (T.A.), reaches us commenting on the opening speech made by Dr. S. Monckton Copeman at the recent discussion under this heading which took place on Feb. 23rd in the section of epidemiology of the Royal Society of Medicine. The writers criticise Dr. Copeman for claiming to have introduced glycerinated lymph, but allow that his reference may have been due to the belated action of the British Government in issuing such lymph from an officially recognised institution. They consider that accuracy requires detailed mention of previous work in similar directions, and give detailed references in support, while they recognise that our report of Dr. Copeman's words was necessarily only a brief résumé.

Those who are historically minded may refer to a leading article in THE LANCET of April 28th, 1900 (p. 1216).

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

Surg. Comdrs. to be Surg. Capts.: G. R. McCowen, H. F. Briggs, C. F. O. Sankey, and F. J. D. Twigg.

F. H. Ward, E. J. Littledale, M. A. Rugg-Gunn, and S. H. Rhys Price to be Surg. Lts.

The following appointments are notified: Surg. Comdrs. G. B. Cockrem to *Effingham* and J. Kirker to *Victory*, for R.N.B.

Surg. Lt. Comdrs. E. C. Davis to *President* for course, and F. R. P. Williams to *Victory* for R.N.B.

Surg. Lt. J. G. V. Smith to *Pembroke* for R.N. Hospital, Chatham.

ARMY MEDICAL SERVICES

Col. W. D. C. Kelly, late R.A.M.C., retires on retd. pay.

ROYAL ARMY MEDICAL CORPS

Lt.-Col. E. W. M. Paine, having attained the age for retirement, is placed on retd. pay.

Maj. C. L. Franklin to be Lt.-Col.

Maj. & Bt. Lt.-Col. C. H. H. Harold and Maj. D. W. Pailthorpe retire on retd. pay.

The undermentioned Lts. to be Capts. (Provl.): A. Macdonald and W. R. M. Drew.

Capt. J. C. Collins to be Maj.

TERRITORIAL ARMY

Lt. R. B. Brew to be Capt.

Lt. H. Rogers resigns his commn. and retains his rank.

Lt. W. F. Dorward resigns his commn.

E. H. Jaques (late Cadet, Durham Univ. Contgt., Sen. Div., O.T.C.) to be Lt.

Supernumerary for service with O.T.C.—2nd Lt. R. W. Rattray to be Lt. supern. for serv. with Med. unit, Edinburgh Univ. Contgt., Sen. Div., O.T.C.

INDIAN MEDICAL SERVICE

Majs. M. L. Treston, A. Chand, R. Lee, T. S. Shastry, C. de C. Martin, J. H. Smith, J. B. de W. Molony, K. R. Batra, B. H. Singh, O. R. Unger, A. H. Harty, N. Briggs, F. R. Thornton, R. L. Vance, F. Griffith, and J. P. Huban to be Lt. Cols.

Temp. Lts. T. R. Pahwa, M. A. Gaffar, and J. N. Vasudeva to be Temp. Capts.

The undermentioned Lts. (on prob.) are rest. to the estabt.: W. M. E. Anderson and J. W. D. Goodall.

P. I. Franks, H. B. Wright, J. M. Davidson, D. P. Dewe, M. G. Leane, and G. E. S. Stewart to be Lts. (on prob.).

Lt.-Col. S. J. Bhathena retires.

ROYAL AIR FORCE

Flight Lt. (Hon. Squadron Leader) G. S. Ware relinquishes his temporary commission on completion of service and is permitted to retain the honorary rank of Squadron Leader.

Flight Lt. (Hon. Squadron Leader) J. G. Skeet relinquishes his temporary commission on completion of service.

COLONIAL MEDICAL SERVICE

The following appointments have been made: Dr. H. C. Armstrong, Dr. J. W. Denoon, Dr. F. J. Sladen, and Dr. G. Watt, Medical Officers to the Gold Coast, and Dr. N. E. W. Anderson, Dr. S. A. B. Black, Dr. R. D. Harding, Dr. A. C. Howard, and Dr. T. H. L. Montgomery, Medical Officers, Nigeria. Dr. W. K. Connell becomes a Junior Surgical Specialist, and Dr. C. F. Shelton a Junior Medical Specialist, Tanganyika. Dr. H. M. Nevin has been appointed Pathologist II., Institute for Medical Research, in the Federated Malay States.

Dr. J. T. Lydon has been appointed Admiralty Surgeon and Agent for Kingstown, and Mr. P. J. Smyth for Dublin.

OBITUARY

JAMES HAIG FERGUSON, F.R.C.P., F.R.C.S. Edin., F.C.O.G.

CONSULTING GYNÆCOLOGIST TO THE LEITH HOSPITAL AND ROYAL INFIRMARY, EDINBURGH

WE regret to announce the death of the well-known surgeon and obstetrician, Dr. Haig Ferguson, which occurred on May 2nd at his house in Coates-crescent, Edinburgh, in his 73rd year.

DR. FERGUSON

[Photograph by [illegible]

James Haig Ferguson was born in 1862 the son of the Rev. William Ferguson, minister of Fossoway, and was educated at the Collegiate School, Edinburgh, and at the medical school of the University. A prominent student he graduated as M.B., C.M. Edin. in 1884, took the M.R.C.P. in 1887, was elected F.R.C.P. in 1889, and proceeded to the M.D. with honours in the following year. He obtained the F.R.C.S. Edin. in 1902, and from that time forward held a series of important posts connected with his chosen specialty as obstetrician and gynæcologist. He served as resident physician at the Infirmary, the Maternity Hospital, and the Edinburgh Hospital for Sick Children. He lectured on midwifery and gynæcology in the University medical school, was both gynæcological and clinical tutor at the infirmary, and was duly appointed assistant to the physician for diseases of women and obstetric physician to the New Town Dispensary. With such varied and excellent equipment in the three great branches of professional knowledge, it is not surprising that he proved to be a practical and successful lecturer and that his services were in demand as an examiner. He acted in this capacity in midwifery and gynæcology at the Royal College of Surgeons, Edinburgh, at the University of Edinburgh, and the University of Aberdeen, and he passed rapidly from assistant to full gynæcological physician at the institutions with which he was connected.

He soon began to communicate to the medical press on obstetrical and gynæcological subjects, writing interesting notes for the *Edinburgh Medical Journal* and especially for the transactions of the Obstetrical Society of Edinburgh, while the reports of the Royal Infirmary contain also papers from him. He wrote a "Notebook of Obstetrical Nursing" in collaboration with the late Dr. F. W. N. Haultain, his colleague at the Public Dispensary, which went through several editions, the fifth one appearing in 1906; he collaborated also in a text-book of "Obstetrics and Gynæcology," and contributed to the "Encyclopædia Medica."

His academic and practical work and the all-round nature of his experience and acquirements fitted him inevitably for high official posts. Like many prominent Edinburgh men he started with presiding over the Royal Medical Society, later he was president of the Edinburgh Obstetrical Society—this twice with some interval, he served the Edinburgh Harveian Society in the same capacity, and was president of the Royal College of Surgeons of Edinburgh for the years 1929–31. He was an F.R.S. Edin. and received the hon. degree of LL.D. from his University and was one of the first Fellows of the College of Obstetrics and Gynæcology. In due course he became consulting physician to the Royal Infirmary, the Leith Hospital, and the Royal Maternity Hospital, while he was for a period chairman of the Central Midwives Board for Scotland. In this capacity he proved himself indeed the right man for the post. He dealt with the problems of the Board in a catholic spirit and was vigilant in seeing that the regulations were drawn in a generous manner, so that the Board was able to examine candidates for the certificate from continental countries and from the U.S.A., a certain reciprocity in registration becoming possible. He was of practical assistance to the General Medical Council in dealing with the situations arising both from the supply of suitable cases for teaching purposes and with the superintendence of the students' education. As a disciplinarian he was fair. He never hesitated to take any steps necessary to deal with unprofessional conduct among midwives, but he was sympathetic in his outlook and in particular he never forgot the public standpoint. As an example of his readiness to adjust the working of the Board to varying interests there may be mentioned his arrangement of a full-dress discussion on notification of puerperal pyrexia with the Obstetrical Society of Edinburgh and with representatives of the public authorities, when his freedom from prejudice stood him in good stead by securing the coöperation of general practitioners.

Ferguson worked at a very high pitch and it seems probable that his relatively early death was related to his unceasing activity and to the large demands on his professional attention. His periods of relaxation were few and took the form of spending short periods at Loch Rannoch. He will be greatly missed by patients, students, and professional colleagues, for he combined first-class professional competence with highly sympathetic personal qualities.

Dr. Ferguson, who was a member of the King's Bodyguard for Scotland (Royal Company of Archers), married in 1889 Penelope Gordon, daughter of the well-known surgeon, the late Sir Patrick Heron Watson, by whom he had one son and three daughters.

Prof. R. W. Johnstone writes: "Dr. Haig Ferguson's death leaves a great blank in the hearts of his friends. His strong but gracious personality never failed to leave an impress for good upon everyone with whom he came in contact. He was a man of handsome physical presence with a noble head and features, which, as age whitened his hair and care lined his face, became imbued with the very spirit of benevolence. His mere presence, as many a patient can attest, brought a helpful influence in all circumstances—comfort, encouragement, strength, good humour, gentleness, charity. An unusually high sense of duty dominated his whole character and life, involving self-sacrifice and self-expenditure to a degree that sometimes seemed almost quixotic but never other than wholly admirable and lovable to those less endowed with it than himself. Such was the charm of character and personality which he radiated that it tends to eclipse in one's mind the greatness of his more strictly professional attainments.

He was, however, a man with fine intellectual gifts. It was inevitable that such a man should obtain a very large practice, and he thus acquired a vast and varied practical experience. He was an exceptionally skilful obstetrician, endowed with that most important of all gifts in such work, patience. As a gynæcologist his sympathy and understanding led him to the heart of the psychological troubles that so often obscure the physical causes of the diseases of women, and gave him the unbounded confidence of his patients. As an operator he was sound and reliable rather than spectacular, and his results were very good. His professional interests were primarily clinical rather than scientific, and this is shown in his writings which are instinct with the wise judgment born of a wide practical experience. The same applies to his teaching, which while revealing a comprehensive knowledge of his subject was always mainly focused on the problem of how best to treat the individual patient. No student or visitor to his wards could fail to benefit from his clinical teaching, and probably none left without perceiving and acquiring something of his high sense of duty to his patients and of his high standard of professional conduct.

"The Transactions of the Edinburgh Obstetrical Society, of which he was twice president, show that Dr. Haig Ferguson was ever active in recording cases of special interest and in contributing papers on questions of practical importance. Amongst his recent contributions to obstetrics and gynæcology his modification of the axis-traction forceps is perhaps the most outstanding, the instrument being one of great practical value. He was also joint author of a well-known 'Combined Textbook' of both subjects, which recently went into a second edition. At the time of his last illness he was engaged in laboriously investigating the records of maternal mortality for the Scottish Department of Health.

"His patience, sagacity, and scrupulous fairness led to much administrative work being placed on his shoulders. He gave endless time and thought to the work of the Central Midwives Board for Scotland, of which he was a member from its inception and chairman for many years up to the time of his death. The Royal Maternity Hospital, the Royal Hospital for Sick Children, the Queen's Institute of District Nursing, and many other boards obtained his active and devoted service. The Royal College of Surgeons, of which he was president in 1929–30, and the 'Extramural School' also claimed much of his interest, while he never failed in attendance upon the meetings of the Obstetrical Society, in which his vast experience and sound judgment were held in the truest respect. The Lauriston Home for Rescue Work owed its inception in large measure to him, and its work and welfare were always close to his heart.

"He was fond of open-air sport, angling and archery for example, but his devotion to his work gave him little time to indulge in them. He loved hospitality and was the most genial of hosts, and the best of dinner-table companions. It would be easy to continue the catalogue of his interests and activities, but in the end one comes back to the man himself. He was in very truth a 'beloved physician,' and a perfect Scottish gentleman."

WEST KENT MEDICO-CHIRURGICAL SOCIETY.—A meeting of this society will be held to-day, Friday, May 11th, at the Miller General Hospital, Greenwich, London, S.E., at 8.45 P.M. Dr. Cassie Williams will give an address on cookery and its relation to medicine.

ALFRED RICHARDSON, M.B., B.S.Lond., F.R.C.S.Eng.

PROFESSOR, CLINICAL SURGERY, UNIVERSITY OF LEEDS; SURGEON, LEEDS GENERAL INFIRMARY

THE sudden death of Alfred Richardson on April 22nd at the age of only 49 years was a profound shock in medical circles and to his many friends in Leeds. He appeared to be the very embodiment of perfect health, gifted with magnificent physique, active, and happy in his work. We are indebted to Mr. L. R. Braithwaite for the following obituary notice:—

"Richardson was essentially a Leeds man. He was a brilliant student qualifying M.B., B.S., London, in 1907, and adding to his qualifying degrees distinction in pharmacology and honours in medicine. He became a house surgeon at the General Infirmary at Leeds and step by step was elected casualty officer, resident surgical officer, surgical registrar and tutor. During his residential appointments he gained the F.R.C.S. England, and was clearly destined for the surgical staff, to which he was elected as an honorary assistant surgeon in 1920, rising to the full staff in 1927.

"Amongst his many other appointments the one he loved best was that of visiting surgeon to the Ministry of Pensions Hospital, where he found himself in an atmosphere of camaraderie and courageous optimism which exactly suited him. The affection between him and his patients at this hospital has been vividly described, and was shown by the large attendance of ex-Service men at his funeral. It need hardly be said that he himself served throughout the war both at home and abroad. He was honorary consulting surgeon at the Ilkley Coronation Hospital, the Normanton and Castleford Hospital, and several others. He succeeded in gathering together a wide and busy practice, especially in areas north of Leeds, where his name was widely known. His services as an expert surgical witness were in constant demand and he had a very large practice in this branch of his profession, his patent sincerity and power of lucid exposition making him invaluable.

"Richardson's capacity for surgery as an art was remarkable. He was cautious, calm, gentle, and yet firm, having always uppermost in his mind the well-being of the patient. His value to the university as a clinical teacher has probably never been surpassed. He was a true 'text-book' man in that he tirelessly drove home the things that were needed to get a qualification; but he did much more than this, he taught the need for sympathy, gentleness, and most rigorous examination and investigation. His popularity with students was proverbial and no success pleased him more than this. When he was appointed professor of clinical surgery about a year ago it was felt that we had in sight the man who would some day lead the surgical side from the more senior chair, and were well satisfied that he would do it with the same quiet enthusiasm which characterised all his work. And those of us who met him so often in the course of the daily round will always value delightful recollections. He would come unexpectedly to one's theatre and look on with a merry twinkle in his eye and a jest on his lips. One would return the visit and be met by the same happy smile and a repartee humorous and caustic but never resentful.

"As a student he showed an unusual interest in and aptitude for sports; his physique made him a redoubtable boxer and footballer. He retained the closest interest in sport, especially in the medical school, up to the time of his death. All loved Richardson as a brother, and as such we mourn him."

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

Lotteries and Hospital Finance

In the House of Lords on May 1st the debate was resumed on the second reading of the Betting and Lotteries Bill.—Lord Somerleyton said there was still a general opinion that the voluntary hospitals of this country were in danger and ought to be supported by sweepstakes or lotteries. The hospitals were, in fact, in a very flourishing condition considering the bad times through which the country had passed. In the year 1931 the aggregate surplus of the London hospitals was £76,000; in 1932 it was £101,000, and it was pretty certain they would be better still for last year. Voluntary gifts to provincial hospitals amounted in 1930 to £12,734,000, and in 1931 to £11,568,000; including London the total for 1931 was £13,741,000. All this voluntary support would be jeopardised by sweepstakes and lotteries.—Lord Luke said that if lotteries on a large scale were to be held in aid of hospitals they would dry up the present sources of voluntary effort, but the Bill wisely permitted competitions which contained an element of skill.—The Earl of Feversham, replying to the debate, said that if the State inaugurated or tolerated the inception of lotteries for the purpose of raising money for hospitals, there would not be the same response from private persons or the same individual interest taken by private persons in their maintenance.—The Bill was read a second time.

Bills Advanced

In the House of Commons on May 1st the Contraceptives Bill and the South Devon and East Cornwall Hospital, Plymouth, Royal Albert Hospital, Devonport, and Central Hospital, Plymouth (Amalgamation, &c.) Bill were introduced and read a first time.

In the House of Lords on May 2nd the Workmen's Compensation (Coal Mines) Bill and the Water Supplies (Exceptional Shortage Orders) Bill were read a second time.

HOUSE OF COMMONS

WEDNESDAY, MAY 2ND

Sanitary Conveniences in Highlands of Scotland

Mr. Leonard asked the Secretary of State for Scotland if he was aware that a complaint was lodged on Jan. 31st, 1933, and a copy sent to the Department of Health, regarding the structural, sanitary, and other defects of the farm of Udale, Ross, and Cromarty, and that the local authority decided that it was not reasonably practicable to introduce water into the houses or to provide water-closets, and that on Dec. 29th, 1933, his department reported that its engineering inspector had advised that it was reasonably practicable to provide water-closets and introduce water; and whether any steps had been taken to force the local authority to carry out its statutory duties.—Sir Godfrey Collins replied: The answer to the first part of the question is in the affirmative. With regard to the second part, the county council have taken steps to secure the introduction of water into the houses, and the provision of a chemical closet for each house. With regard to the third part, there is no further action which, in the circumstances of this case, I can take.

Charges at a Municipal Maternity Home

Mr. Anstruther-Gray asked the Minister of Health whether his attention had been drawn to the fact that the Ilford council maternity home had charged a police constable £13 10*s*. for 16 days that his wife was in the home; and, in view of the declared practice of the home to base their charges on the income of the patient, he would inquire into the case, in view of the fact that a police constable's wages were insufficient to support so heavy a charge.—Mr. Shakespeare replied: The question of the charges to be made at this home is a matter within the discretion of the town council, but my right hon. friend will communicate with the council and inform my hon. friend of the result.

Suggested Flogging for Burglars

Mr. Potter asked the Home Secretary if, having regard to the increasing number of burglaries and to the hardship and suffering caused to those affected thereby, he would introduce legislation making it a condition that, in conjunction with punishment inflicted upon the offenders, there should be administered so many strokes of the cat as may be recommended by his medical advisers in such cases.—Sir J. Gilmour: There has been a large increase in recent years in cases of "breaking and entering," but the increase has been comparatively small in the particular crime of burglary, which is limited to entry of dwelling-houses by night. A large number of offences of house-breaking and shopbreaking are committed by persons, often young persons or children, who enter small houses or shops which are temporarily unoccupied and take small sums of money. Of the persons found guilty in 1932 of breaking and entering one-third were under 16 years of age, and over one-half were under 21 years of age. I do not think that the suggestion of my hon. friend would be a suitable method of dealing with the situation.

Coal-miners and Silicosis

Mr. David Grenfell asked the Home Secretary the number of men employed in the coal-mining industry who had been certified to be disabled through silicosis; the number partially disabled; the number in receipt of compensation; and the number of fatal cases recorded since Jan. 1st.—Sir John Gilmour replied: Since June 1st, 1931, when the medical board was appointed, up to April 30th, 1934, there have been 437 coal-miners certified by the board as disabled; 129 of these were certified as partially disabled. Earlier comparable figures are not available. From Feb. 1st, 1929, when the Various Industries (Silicosis) Scheme came into operation, up to the end of 1932, compensation was paid in 143 cases of disablement. There was a large number of cases in 1933, but the precise figure is not yet available. The number of deaths certified since Jan. 1st last is 14.

THURSDAY, MAY 3RD

Sickness Benefit and Public Assistance

Mr. Holdsworth asked the Minister of Health whether he was now in a position to reply to the representations made to him by the National Conference of Friendly Societies concerning Section 48 of the Poor Law Act, 1930, in which attention was drawn to the wrongful action taken by the London County Council whereby members of friendly societies had been having their sickness benefit wholly included when incomes were being assessed, or the needs tests being applied, in respect of applications received by that body for public assistance; and whether he now proposed, as a result of what transpired in London, to issue a special instruction on the subject to all public assistance committees.—Sir Hilton Young replied: I have now received further legal advice in regard to the proper interpretation of Section 48 of the Poor Law Act, 1930, and I propose to communicate the effect of that advice to public assistance authorities at an early date, and to furnish the National Conference with a copy of the circular to be issued.

MONDAY, MAY 7TH

Milk Publicity Campaign

Mr. Maclay asked the Minister of Agriculture whether he would draw the attention of the Milk Marketing Board to the importance of commencing as early as possible an extensive advertising campaign to encourage the public to consume more milk.—Mr. Ormsby-Gore, First Commissioner of Works, replied: My right hon. friend is quite satisfied that the Milk Marketing Board fully realise the desirability of encouraging the public to consume more milk; and the hon. Member will recollect that the proposals which he explained in his statement on milk policy in this House on Feb. 22nd include the provision of funds for a publicity campaign. Schemes for that purpose are now being formulated.

Cleanliness of Imported Milk Products

Mr. LAMBERT asked the Minister of Health if he was satisfied that all imported milk products were produced from healthy animals kept in conditions of cleanliness.—Mr. SHAKESPEARE, Parliamentary Secretary to the Ministry of Health, replied : My right hon. friend is not in a position to say that all milk products are made from healthy animals kept in conditions of cleanliness, but he understands that most of the imported products are made from pasteurised milk or cream.

Mr. LAMBERT : Are we to understand that any kind of muck can be brought into this country under the name of butter, made under the most filthy conditions ?

Mr. SHAKESPEARE : I am informed that no danger to public health is involved.

Lieut.-Colonel ACLAND-TROYTE : Is there no inspection at the port to see what is the condition of the butter brought in ?

Mr. HANNON : Are we to understand that the Government can introduce no machinery to test the quality of the original milk from which these products are manufactured ?

Mr. SHAKESPEARE : Of course we can introduce machinery, but I should not like to come to the House and ask for a large expenditure which I could not justify.

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MEDICAL NEWS

English Conjoint Board

At the recent final examination of the Board the following candidates were approved in the subjects indicated, but are not yet eligible for the diploma of the Colleges :—

Pathology.—S. Alankaram, Madras and Roy. Free ; C. Anderson, St. Bart.'s ; W. G. R. Ashley-Emile, Middx. ; A. C. Ashton, Manch. ; S. H. Awad, Univ. Coll. and Glasg. ; K. C. Bailey, Camb. and St. Thos. ; E. B. D. Bangay, St. Bart.'s ; Mary Barber, Roy. Free ; C. Bard, Lond. ; R. I. Bence, Oxon. and Lond. ; H. B. Birnbaum, Glasg. ; J. R. Bodington, Camb. and Lond. ; E. J. J. Borges, Bombay and Middx. ; D. M. Bressler, St. Bart.'s ; B. B. Bridges, Camb. and Guy's ; J. L. Brown, Liverp. ; N. P. Brown, Camb. and Middx. ; R. W. D. Brownlie, Guy's ; E. W. Burstal, St. Bart.'s ; W. P. Cargill, Manch. ; R. M. Case, Birm. ; W. W. Cashmore, Camb. and Guy's ; R. C. F. Catterall, Camb. and Univ. Coll. ; J. G. Chappel, Univ. Coll. ; R. Clarke, Oxon. and St. Mary's ; Gladys E. Clyne, Roy. Free ; S. Cohen, St. Barts.'s ; N. D. Cousins, Manch. ; F. F. Croft, St. Bart.'s ; L. M. Curtiss, St. Bart.'s ; A. P. Dale-Bussell, Guy's ; M. C. Damkengrit, Camb. and St. Thos. ; S. M. Davidson, Camb. and St. Mary's ; C. E. M. de Gruchy and G. C. Denny, Guy's ; S. Devi, Roy. Free ; E. W. Dunkley, Lond. ; K. G. Eckersley, Leeds ; R. Farncombe, St. George's ; I. A. Feldman, Leeds ; J. D. Fergusson, Camb. and St. Thos. ; B. W. Fickling, St. George's ; W. J. Finegold, Charing Cross ; I. Finer, Guy's ; H. Firman, Manch. ; I. C. Fletcher, Camb. and Middx. ; J. R. Forbes, Guy's ; Margaret J. Foster, Camb. and Univ. Coll. ; Joan I. Franklin-Adams, Roy. Free ; E. Galinsky, Univ. Coll. ; J. E. Giesen, Guy's ; A. B. F. Gibson, Camb. and St. Thos. ; P. Glazer, King's Coll. ; C. H. Goodliffe, Birm. ; M. E. Gordon, Cardiff ; B. S. Grant, Lond. ; E. O'D. C. Grattan, Camb. and St. Thos. ; B. J. Green, and S. G. Griffin, Liverp. ; J. A. G. Hair, Univ. Coll. ; Irene G. Hamilton, Bristol ; E. E. Harris, Camb. and St. Bart.'s ; R. L. Hartley, Liverp. ; G. R. Hawkes, Camb. and Liverp. ; H. F. G. Hensel, Lond. ; T. H. Hills, Guy's ; C. A. Hinds Howell, Oxon. and St. Bart.'s ; J. Holden, Leeds ; D. A. B. Hopkin, St. Mary's ; J. J. V. Hopkins, St. Bart.'s ; J. H. Hovell, Charing Cross ; J. E. Ives, *Camb. and Univ. Coll.* ; J. I. A. *Jamieson*, Manch. ; J. E. V. Jones, Camb. and St. Thos. ; O. L. Jones, Liverp. ; D. Joy, Univ. Coll. ; G. H. W. Keates, Guy's ; W. E. Kershaw, Manch. ; A. W. Khan, Manch. ; E. L. Kirstein, Univ. Coll. ; E. H. Kitching, Leeds ; F. B. Lake, Guy's ; M. Lederman, Westminster ; M. J. Levi, Leeds ; W. Libertson, St. Bart.'s ; W. N. Lippitt, Birm. ; O. Lloyd, Middx. ; J. F. Lockwood, Guy's ; M. C. W. Long, St. Mary's ; E. B. McDowall, Camb. and St. Thos. ; H. M. McGladdery and R. McGladdery, St. Bart.'s ; *K. M. Mayall, Camb. and St. George's* ; *Ellen* Mayer, King's Coll. ; A. B. G. Mein, Westminster ; A. G. H. Menzies, Liverp. ; W. J. Mitchell, Guy's ; A. Moore, Univ. Coll. ; D. C. Moore, Manch. ; J. H. Moseley, Camb. and St. Thos. ; A. Mukerji, Middx. ; C. W. F. Outred, Guy's ; W. O. G. Paget, St. Bart.'s ; G. R. C. Palmer, St. Thos. ; R. L. Parish, Manch. ; G. W. V. Pegge, St. Mary's ; S. Phillips, King's Coll. ; E. H. Platts, Leeds ; A. W. Probert, Univ. Coll. ; J. Rabinovitch, Leeds ; J. Rapoport, St. Mary's ; H. W. Rees, Middx. ; W. G. S. Roberts, Birm. and *St. Thos.* ; *G. S. Robinson, Camb. and* Liverp. ; J. Robyns-Jones, Liverp. ; J. S. Ross, Camb. and St. Thos. ; Jean Ross, Univ. Coll. ; L. M. Rouillard, St. Thos. ; C. Royle, Manch. ; C. R. St. Johnston, Birm. ; S. V. Sansom, St. Bart.'s ; B. J. Shaw, Bir [illegible] Guy's ; H. Silman, Leeds ; A. S. R. Sinto [illegible] Smithson, Leeds ; B. P. Stone, King's [illegible] kes, Univ. Coll. ; E. W. Tapley, Manch. ; Dorothy H. Thomas, Univ. Coll. ; J. B. Tointon, Camb. and St. Thos. ; R. P. Tong, Liverp. ; B. M. *Truscott, Middx.* ; *R. W. D. Turner, Camb.* and St. Thos. ; M. M. Waldman, Westminster ; P. A. Walford, Camb. and St. Thos. ; T. J. Walters, St. Mary's ; F. G. Ward, Oxon. and St. Bart's ; M. Watkins, St. Mary's ; J. D. S. Watling and C. W. K. Willard, Univ. Coll. ; G. N. M. Wishart, Manch. ; H. L. Wolfe, St. Bart.'s ; G. M. Woolford, St. *Thos.* ; and H. Yarrow and J. G. Youngman, St. Bart.'s.

Medicine.—N. Angel, Birm. ; T. G. Armstrong, Camb. and Lond. ; E. C. Atkinson, St. Bart.'s ; Margaret D. Baber, Univ. *Coll.* ; J. C. *Baillie, King's Coll.* ; Mary Barber, Roy. Free ; G. Bates, Birm. ; R. I. Bence, Oxon. and Lond. ; D. Bickler, Leeds ; J. R. Bodington, Camb. and Lond. ; E. J. J. Borges, Bombay and Middx. ; D. M. Bressler, St. Bart.'s ; Jean M. Cass, Roy. Free ; R. Clarke, Oxon. and St. Mary's ; S. G. Clayton, King's Coll.; J. E. Darlow, Guy's; G. R. Davis, King's Coll.; N. J. Dias, St. Bart.'s; Dorothy S. Radcliffe Drew, Roy. Free; F. I. Evans, Camb. and Guy's; J. D. Fergusson, Camb. and St. Thos.; H. P. Fernandes, St. Bart.'s; Mervia Forrester-Jones, West Lond.; J. French and L. D. R. Frost, St. Bart.'s; D. J. Gilbert, King's Coll.; A. J. Glazebrook, St. George's; M. E. Gordon, Cardiff; E. O. C. Grattan, Camb. and St. Thos.; C. E. Greenwood, Oxon. and King's Coll.; P. R. Greeves, Oxon. and Middx; E. E. Harris, Camb. and St. Bart.'s; G. W. Hayward, St. Bart.'s; C. C. Hurst, Manch.; J. H. Lankester, Camb. and St. Thos.; W. Libertson, St. Bart.'s; W. N. Lippitt, Birm.; A. J. McCall, Liverp.; D. de la C. MacCarthy, St. Bart.'s; M. L. Meade-King, Camb. and Westminster; A. Moore, Univ. Coll.; G. H. Moore, Manch.; P. Morris, Westminster; R. M. Noordin and A. J. Owston, St. Bart.'s; W. H. Phillipps, Camb. and St. Thos.; W. H. A. Pieton, Oxon. and King's Coll.; R. M. G. Pole, St. Bart.'s; W. W. Roberts, Birm. and Sheff.; Katharine C. Rogers, Roy. Free; D. Sanyal, Lond.; I. C. Sarwal, Bombay and St. Bart.'s; S. R. Saunders, Cardiff; S. G. Shippard, King's Coll.; N. W. Sivolella, St. Bart.'s; A. F. Stallard, Camb. and St. Bart.'s; E. W. Tapley, Manch.; M. J. H. Thomas, Univ. Coll.; R. W. D. Turner, Camb. and St. Thos.; J. K. R. Waddington, Liverp.; B. Weiner, St. Bart.'s; and K. H. Wright, Guy's.

Surgery.—S. Alankaram, Roy. Free; A. G. V. Aldridge, Camb. and Birm.; I. J. Amorin, Manch.; W. G. R. Ashley-Emile, Middx.; C. H. Bliss and J. W. F. Brown, St. Thos.; E. J. Bury, Camb. and St. Mary's; I. Byer, St. Bart.'s; T. S. Cave, Camb. and King's Coll.; J. G. Chappel, Univ. Coll.; Gladys E. Clyne, Roy. Free; R. H. Dale, Camb. and St. Bart.'s; R. S. Dale, St. Mary's; J. R. Davidson, Univ. Coll.; D. H. Davies, Camb. and Middx.; G. M. Denning, Bristol and St. Mary's; A. R. O. Denton, Guy's; K. C. Eden, Univ. Coll.; T. S. Eddy and A. G. Edwards, Guy's; D. M. Evans, St. Bart.'s; E. W. R. Fairley, St. Thos.; E. L. Fisher, St. Bart.'s; P. S. Fox, Leeds; C. S. France, Manch.; C. M. Fysh, St. Thos.; A. B. F. Gibson, Camb. and St. Thos.; K. D. Gibson, St. George's; V. R. Ginde, Bombay and West Lond.; C. H. Goodliffe, Birm.; G. B. Grayling, Roy. Inf. Leicester; H. A. Hamilton, Camb. and Guy's; M. Hamilton, Univ. Coll.; W. H. C. M. Hamilton, Camb. and St. Thos.; G. R. Hawkes, Camb. and Liverp.; F. Janus, Manch.; F. J. G. Jefferiss, St. Mary's; J. R. R. Jenkins, St. Bart.'s; B. S. Jirge, West Lond.; D. R. Jones, Cardiff; P. G. C. Jones, Guy's; T. E. Jones-Davies, Camb. and St. George's; A. W. Khan, Manch.; M. B. Khan, Leeds; N. F. Kirkman, Manch.; J. L. Lanceley, Liverp.; W. A. Law, Camb. and Lond.; M. C. W. Long, St. Mary's; G. G. Macdonald, Univ. Coll.; E. B. McDowall, Camb. and St. Thos.; J. A. Mansi, St. Bart.'s; R. A. Mathews, Bristol; G. H. Moore, Manch.; R. S. Morris, Camb. and St. Thos.; E. J. Moynahan, Univ. Coll.; Edith A. S. Parry-Evans, Roy. Free; H. F. Patrick and S. H. Pearse, St. Thos.; G. W. V. Pegge, St. Mary's; R. Peters, Univ. Coll.; R. A. Piachaud, Ceylon and Univ. Coll.; T. H. Pierce, Liverp.; M. R. Preston, Middx.; E. J. Pryn, Guy's; R. H. Purnell, St. Bart.'s; S. Ramgoolam, Univ. Coll.; E. A. Richards, St. Thos.; Katharine C. Rogers, Roy. Free; I. Slome, Lond.; K. Soddy, Univ. Coll.; J. Starkie, Manch.; J. Stern and F. G. St. C. Strange, Lond.; J. C. Thomas, Univ. Coll.; Dorothy J. Thompson, Camb. and Bristol; R. C. H. Tripp and R. J. Vakil, St. Thos.; P. A. Walford, Camb. and St. Thos.; S. M. Whitteridge, Guy's; O. C. Wilkinson, Birm.; T. M. Williams, St. Thos.; P. L. E. Wood, Camb. and St. Thos.; R. F. Wyatt, St. Thos.; P. L. Young, St. Bart.'s; and Betty M. Zeal, Univ. Coll.

Midwifery.—A. G. V. Aldridge, Camb. and Birm.; A. W. H. Ashbery, Birm.; R. A. J. Asher, Lond.; G. T. Balean, Guy's; Phyllis M. Ball, Birm.; C. R. Barker, Univ. Coll.; D. Bhatia, West Lond.; A. P. Booth, Lond.; H. S. Brodribb, St. Bart.'s; J. A. B. Burnett, Charing Cross; Margaret M. B. Carey, Roy. Free; R. S. Carpenter, Lond.; Jean M. Cass, Roy. Free; R. C. F. Catterall, Camb. and Univ. Coll.; H. G. Ceresoto, St. Bart.'s; J. G. Chappel and S. C. Chatterjee, Univ. Coll.; W. E. Clarke, Charing Cross; W. B. Clegg, Guy's; A. B. Concanon, Liverp.; J. H. L. Conway-Hughes, St. Bart.'s; E. C. Cordeaux, Middx.; F. H. Culshaw and R. H. Dale, St. Bart.'s; J. R. Davidson, Univ. Coll.; D. A. Davies, Guy's; W. J. F. Davies, Cardiff; Bessie Dodd, Liverp.; E. W. Dunkley, Lond.; R. S. Ellis-Brown, Guy's; D. M. Evans, St. Bart.'s; E. W. R. Fairley, St. Thos.; A. Fearnley, King's Coll.; B. W. Fickling, St. George's; A. R. Ford, St. Bart.'s; I. M. Fradkin, Lond.; E. Galinsky, Univ. Coll.; V. R. Ginde, West Lond.; Muriel C. Goodchild, Roy. Free; C. H. Goodliffe, Birm.; B. S. Grant, Lond.; S. A. Greenwood-Penny, St. George's; W. E. Hadden, St. Thos.; H. A. Hamilton, Camb. and Guy's; M. J. Harris, Guy's; G. R. Hawkes, Camb. and Liverp.; G. H. M. Hemsted, St. Mary's; H. F. G. Hensel, Lond.; C. F. Heys, Guy's; K. F. W. Hinson and D. A. B. Hopkin, St. Mary's; J. J. V. Hopkins, St. Bart.'s; J. H. Hovell, Charing Cross; J. H. Hudson, Leeds; Ruth Hull, King's Coll.; J. J. Human, St. Mary's; B. S. Jirge, West Lond.; D. M. Jones, St. Bart.'s; R. N. Jones, Birm.; H. Kaplan, Cape and Guy's; M. R. Kark, Guy's; A. H. Khan, Birm.; E. L. Kirstein, Univ. Coll.; F. B. Lake, Guy's; F. H. Lamb, St. Thos.; M. Lederman, Westminster; A. R. Lee, Sheff.; F. D. M. Livingstone, Camb. and St. Bart.'s; O. Lloyd, Middx.; M. C. W. Long, St. Mary's; Christia F. Lucas, Birm.; A. J. McCall, Liverp.; R. McDonald, Guy's; E. B. Z. Masterman, Camb. and St. Bart.'s; J. G. Mathias, Lond.; D. Matthews, Cardiff; A. B. G. Mein, Westminster; R. L. Moody, St. Thos.; G. H. Moore, Manch.; A. Mukerji, Middx.; H. Nagler, Charing Cross; J. G. Nel, St. Bart.'s; W. S. Noble, Guy's; A. R. H. Oakley, Middx.; H. E. Osen, St. Bart.'s; S. Paletz, St. George's; Edith A. S. Parry-Evans, Roy. Free; Mary Paulosky, West Lond.; A. Pearlman, Middx.; A. L. Peers, Guy's; E. J. Perks, Bristol; S. Phillips, King's Coll.; Lillian M. Pickford, Univ. Coll.; G. Pollack, St. Mary's; T. S. Protheroe, Guy's; R. H. Purnell, St. Bart.'s; C. O. Ribeiro, Univ. Coll.; D. T. Richards, Cardiff; S. Roberts, Bristol; Katharine C. Rogers, Roy. Free; M. Rooms and Eileen G. Rose, Leeds; W. T. Ross, Cape and St. Bart.'s; C. R. St. Johnston, Birm.; J. K. Samuel, St. Thos.; L. E. Sealy, Bristol; N. H. Seaton, Univ. Coll.; C. W. F. Shuttleworth, Guy's; J. Simon, Lond.; A. S. R. [illegible], Westminster; T. [illegible], St. Bart.'s; A. C. [illegible], Camb. and Middx.; F. G. St. C. Strange, Lond.; D. W. H. Thomas, St. George's; J. C. Thomas, Univ. Coll.; M. J. H. Thomas, Middx.; [illegible], Univ. Coll.; R. P. Tong, Liverp.; W. Wake, St. Bart.'s; M. N. [illegible], Lond.; J. K. R. Waddington, Liverp.; [illegible], St. Mary's; F. H. Waldman, Westminster; T. J. Walters, St. Mary's; [illegible] Watkins, Camb. and Manch.; J. G. Weston, Dubl. and Guy's; P. O. Wharton, [illegible]; S. M. Whitteridge, Guy's; O. C. Wilkinson, Birm.; A. E. Williams, Westminster; F. M. Wright, St. Bart.'s; [illegible] Yates, Lond.; and Winifred F. Young, Camb. and King's Coll.

University of London

During the period 1934–38 the faculty of medicine will be represented in the senate by Mr. H. L. Eason, M.S. (reappointed), and Dr. A. M. H. Gray. Mr. W. Girling Ball, F.R.C.S., will represent the general medical schools.

University of Birmingham

Dr. Stuart McDonald has been appointed lecturer in pathology in the university. He is at present demonstrator of pathology at the University of Durham College of Medicine, Newcastle-upon-Tyne.

Royal Medico-Psychological Association

The subject of the fifteenth Maudsley lecture, which Lord Macmillan is delivering to this association on Thursday, May 17th, at 3 P.M., will be the Professional Mind. The lecturer is president of the National Institute of Industrial Psychology. The meeting will take place at Manson House, 26, Portland-place, London, W.1.

Epsom College

The Council of Epsom College will shortly award a pension of £30 a year to a duly qualified medical man of not less than 55 years of age. If the candidate is a single man or a widower his income, independent of any allowance from the College or from the Royal Medical Benevolent Fund, must not exceed £100 per annum. Forms of application should be obtained forthwith from the Secretary, Epsom College, 49, Bedford-square, W.C.1, and must be returned completed to him not later than May 30th, 1934.

Tuberculosis Scholarships in Rome

The Italian Fascist National Federation against Tuberculosis has placed at the disposal of the Internat Union against Tuberculosis six scholarships at the Mussolini Institute in Rome. They are each of a of 6000 lire, plus board and lodging, and are inten enable foreign medical practitioners to stay at the ins and follow a course of studies. This stage of eight m will correspond with the academic year (from Nov. to July 15th) interrupted by the usual holiday perio

The scholarships will preferably be awarded to yo physicians who are already familiar with tuberculo problems, and the kind of work undertaken will be subj to agreement with the director of the institute.

Application should be made through the secretary the National Association for the Prevention of Tuberculosis, Tavistock House North, Tavistock-square, London, W.C. 1, not later than July 1st.

London School of Hygiene and Tropical Medicine

The 1934–35 course of study at the school, whicl qualifies students to sit for the University of Londo diploma in public health, and covers a period of nin months' whole-time work, will begin on Oct. 1st. A open competition will be held on June 28th–29th for the Fishmongers' Company studentship which carries a free place in the course. Applications for this studentship must be sent in by June 18th to the secretary of the school, Keppel-street, Gower-street, W.C.1.

The Langley Memorial prize, of the approximate value of £21, is open to competition amongst officers of the West African medical staff, whether on the active or retired list. The award will be made for the best paper on tropical medicine or surgery; tropical hygiene and sanitation; or tropical entomology and parasitology. Special consideration will be given to original work. Papers must be delivered to the secretary of the school before Oct. 1st.

in this House on Feb. 22nd include the provision of funds for a publicity campaign. Schemes for that purpose are now being formulated.

Cleanliness of Imported Milk Products

Mr. Lambert asked the Minister of Health if he was satisfied that all imported milk products were produced from healthy animals kept in conditions of cleanliness.—Mr. Shakespeare, Parliamentary Secretary to the Ministry of Health, replied : My right hon. friend is not in a position to say that all milk products are made from healthy animals kept in conditions of cleanliness, but he understands that most of the imported products are made from pasteurised milk or cream.

Mr. Lambert : Are we to understand that any kind of muck can be brought into this country under the name of butter, made under the most filthy conditions ?

Mr. Shakespeare : I am informed that no danger to public health is involved.

Lieut.-Colonel Acland-Troyte : Is there no inspection at the port to see what is the condition of the butter brought in ?

Mr. Hannon : Are we to understand that the Government can introduce no machinery to test the quality of the original milk from which these products are manufactured ?

Mr. Shakespeare : Of course we can introduce machinery, but I should not like to come to the House and ask for a large expenditure which I could not justify.

Mr. Hannon : Are the people of this country to feed on milk products made from milk of the composition of which we have no knowledge whatever ?

Sir W. Wayland : Has the hon. gentleman ever visited a Polish or Russian dairy farm ?

Mr. Shakespeare said that if the product was in liquid form the Ministry had ample powers and regulations with regard to bacteriological examination, but as regards non-liquid products he was informed there was no danger to health.

TUESDAY, MAY 8TH

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Brigadier-General Clifton Brown asked the Prime Minister whether he would publish the report of the scientific committee appointed by the Economic Advisory Council to consider the incidence of milk-borne diseases ; and whether steps would be taken to submit its findings to agricultural interests, as well as to medical authorities, before any legislative action was taken thereon.—Mr. Macdonald replied : The Committee's report has only just been received, and it has not yet been possible to consider the question of its publication. My hon. and gallant friend may rest assured that the interests of every section of the population will be carefully borne in mind by H.M. Government when they review the conclusions reached by the Committee.

Mr. Lambert asked whether, as this was a committee paid for by the taxpayer, the taxpayer could not have the benefit of their advice.

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Mr. Lambert asked if he was aware that this question of milk-borne diseases was of extreme importance as affecting the agricultural industry, and if he would, if possible, publish the report.

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Mr. David Davies asked the Parliamentary Secretary to the Board of Education how much money was recovered fromparents in respect of charges for medical treatment during the last school year.—Mr. Ramsbotham replied : The amount recovered from parents in respect of the medical treatment of children attending public elementary schools during the financial year 1931–32, the latest period for which complete audited accounts of local education authorities are yet available, was £69,370.

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English Conjoint Board

At the recent final examination of the Board the following candidates were approved in the subjects indicated, but are not yet eligible for the diploma of the Colleges :—

Pathology.—S. Alankaram, Madras and Roy. Free ; C. Anderson, St. Bart.'s ; W. G. R. Ashley-Emile, Middx. ; A. C. Ashton, Manch. ; S. H. Awad, Univ. Coll. and Glasg. ; K. C. Bailey, Camb. and St. Thos. ; E. B. D. Bangay, St. Bart.'s ; Mary Barber, Roy. Free ; C. Bard, Lond. ; R. I. Bence, Oxon. and Lond. ; H. B. Birnbaum, Glasg. ; J. R. Bodington, Camb. and Lond. ; E. J. J. Borges, Bombay and Middx. ; D. M. Bressler, St. Bart.'s ; B. B. Bridges, Camb. and Guy's ; J. L. Brown, Liverp. ; N. P. Brown, Camb. and Middx. ; R. W. D. Brownlie, Guy's ; E. W. Burstal, St. Bart.'s ; W. P. Cargill, Manch. ; R. M. Case, Birm. ; W. W. Cashmore, Camb. and Guy's ; R. C. F. Catterall, Camb. and Univ. Coll. ; J. G. Chappel, Univ. Coll. ; R. Clarke, Oxon. and St. Mary's ; Gladys E. Clyne, Roy. Free ; S. Cohen, St. Barts.'s ; N. D. Cousins, Manch. ; F. F. Croft, St. Bart.'s ; L. M. Curtiss, St. Bart.'s ; A. P. Dale-Bussell, Guy's ; M. C. Damkengrit, Camb. and St. Thos. ; S. M. Davidson, Camb. and St. Mary's ; C. E. M. de Gruchy and G. C. Denny, Guy's ; S. Devi, Roy. Free ; E. W. Dunkley, Lond. ; K. G. Eckersley, Leeds ; R. Farncombe, St. George's ; I. A. Feldman, Leeds ; J. D. Fergusson, Camb. and St. Thos. ; B. W. Fickling, St. George's ; W. J. Finegold, Charing Cross ; I. Finer, Guy's ; H. Firman, Manch. ; I. C. Fletcher, Camb. and Middx. ; J. R. Forbes, Guy's ; Margaret J. Foster, Camb. and Univ. Coll. ; Joan I. Franklin-Adams, Roy. Free ; E. Galinsky, Univ. Coll. ; J. E. Giesen, Guy's ; A. B. F. Gibson, Camb. and St. Thos. ; P. Glazer, King's Coll. ; C. H. Goodliffe, Birm. ; M. E. Gordon, Cardiff ; B. S. Grant, Lond. ; E. O'D. C. Grattan, Camb. and St. Thos. ; B. J. Green, and S. G. Griffin, Liverp. ; J. A. G. Hair, Univ. Coll. ; Irene G. Hamilton, Bristol ; E. E. Harris, Camb. and St. Bart.'s ; R. L. Hartley, Liverp. ; G. R. Hawkes, Camb. and Liverp. ; H. F. G. Hensel, Lond. ; T. H. Hills, Guy's ; C. A. Hinds Howell, Oxon. and St. Bart.'s ; J. Holden, Leeds ; D. A. B. Hopkin, St. Mary's ; J. J. V. Hopkins, St. Bart.'s ; J. H. Hovell, Charing Cross ; J. E. Ives, Camb. and Univ. Coll. ; J. I. A. Jamieson, Manch. ; J. E. V. Jones, Camb. and St. Thos. ; O. L. Jones, Liverp. ; D. Joy, Univ. Coll. ; G. H. W. Keates, Guy's ; W. E. Kershaw, Manch. ; A. W. Khan, Manch. ; E. L. Kirstein, Univ. Coll. ; E. H. Kitching, Leeds ; F. B. Lake, Guy's ; M. Lederman, Westminster ; M. J. Levi, Leeds ; W. Libertson, St. Bart.'s ; W. N. Lippitt, Birm. ; O. Lloyd, Middx. ; J. F. Lockwood, Guy's ; M. C. W. Long, St. Mary's ; E. B. McDowall, Camb. and St. Thos. ; H. M. McGladdery and R. McGladdery, St. Bart.'s ; K. M. Mayall, Camb. and St. George's ; Ellen Mayer, King's Coll. ; A. B. G. Mein, Westminster ; A. G. H. Menzies, Liverp. ; W. J. Mitchell, Guy's ; A. Moore, Univ. Coll. ; D. C. Moore, Manch. ; J. H. Moseley, Camb. and St. Thos. ; A. Mukerji, Middx. ; C. W. F. Outred, Guy's ; W. O. G. Paget, St. Bart.'s ; G. R. C. Palmer, St. Thos. ; R. L. Parish, Manch. ; G. W. V. Pegge, St. Mary's ; S. Phillips, King's Coll. ; E. H. Platts, Leeds ; A. W. Probert, Univ. Coll. ; J. Rabinovitch, Leeds ; J. Rapoport, St. Mary's ; H. W. Rees, Middx. ; W. G. S. Roberts, Birm. and St. Thos. ; G. S. Robinson, Camb. and Liverp. ; J. Robyns-Jones, Liverp. ; J. S. Ross, Camb. and St. Thos. ; Jean Ross, Univ. Coll. ; L. M. Rouillard, St. Thos. ; C. Royle, Manch. ; C. R. St. Johnston, Birm. ; S. V. Sansom, St. Bart.'s ; B. J. Shaw, Bir [illegible] Guy's ; H. Silman, Leeds ; A. S. R. Sinto[illegible] Smithson, Leeds ; B. P. Stone, King's [illegible] kes, Univ. Coll. ; E. W. Tapley, Manch. ; Dorothy H. Thomas, Univ. Coll. ; J. B. Tointon, Camb. and St. Thos. ; R. P. Tong, Liverp. ; B. M. Truscott, Middx. ; R. W. D. Turner, Camb. and St. Thos. ; M. M. Waldman, Westminster ; P. A. Walford, Camb. and St. Thos. ; T. J. Walters, St. Mary's ; F. G. Ward, Oxon. and St. Bart's ; M. Watkins, St. Mary's ; J. D. S. Watling and C. W. K. Willard, Univ. Coll. ; G. N. M. Wishart, Manch. ; H. L. Wolfe, St. Bart.'s ; G. M. Woolford, St. Thos. ; and H. Yarrow and J. G. Youngman, St. Bart.'s.

Medicine.—N. Angel, Birm. ; T. G. Armstrong, Camb. and Lond. ; E. C. Atkinson, St. Bart.'s ; Margaret D. Baber, Univ. Coll. ; J. C. Baillie, King's Coll. ; Mary Barber, Roy. Free ; G. Bates, Birm. ; R. I. Bence, Oxon. and Lond. ; D. Bickler, Leeds ; J. R. Bodington, Camb. and Lond. ; E. J. J. Borges, Bombay and Middx. ; D. M. Bressler, St. Bart.'s ; Jean M. Cass, Roy. Free ; R. Clarke, Oxon. and St. Mary's ; S. G. Clayton, King's Coll.; J. E. Darlow, Guy's; G. B. Davis, King's Coll.; N. J. Dias, St. Bart.'s; Dorothy S. Radcliffe Drew, Roy. Free; F. I. Evans, Camb. and Guy's; J. D. Fergusson, Camb. and St. Thos.; H. P. Fernandes, St. Bart.'s; Mercia Force-Jones, West Lond.; J. French and L. D. B. Frost, St. Bart.'s; D. J. Gilbert, King's Coll.; A. J. Glazebrook, St. George's; M. E. Gordon, Cardiff; E. O. C. Grattan, Camb. and St. Thos.; C. E. Greenwood, Oxon. and King's Coll.: P. R. Greeves, Oxon. and Middx; E. E. Harris, Camb. and St. Bart.'s; G. W. Hayward, St. Bart.'s; C. C. Hurst, Manch.; J. H. Lankester, Camb. and St. Thos.; W. Libertson, St. Bart.'s; W. N. Lippitt, Birm.; A. J. McCall, Liverp.; D. de la C. MacCarthy, St. Bart.'s; M. L. Meade-King, Camb. and Westminster; A. Moore, Univ. Coll.; G. H. Moore, Manch.; P. Morris, Westminster; R. M. Noordin and A. J. Owston, St. Bart.'s; W. H. Phillipps, Camb. and St. Thos.; W. H. A. Pieton, Oxon. and King's Coll.; R. M. G. Pole, St. Bart.'s; W. W. Roberts, Birm. and Sheff.; Katharine C. Rogers, Roy. Free; D. Sanyal, Lond.; I. C. Sarwal, Bombay and St. Bart.'s; S. R. Saunders, Cardiff; S. G. Shippard, King's Coll.; N. W. Sivolella, St. Bart.'s; A. F. Stallard, Camb. and St. Bart.'s; E. W. Tapley, Manch.; M. J. H. Thomas, Univ. Coll.; R. W. D. Turner, Camb. and St. Thos.; J. K. B. Waddington, Liverp.; B. Weiner, St. Bart.'s; and K. H. Wright, Guy's.

Surgery.—S. Alankaram, Roy. Free; A. G. V. Aldridge, Camb. and Birm.; I. J. Amorin, Manch.; W. G. R. Ashley-Emile, Middx.; C. H. Bliss and J. W. F. Brown, St. Thos.; E. J. Bury, Camb. and St. Mary's; I. Byer, St. Bart.'s; T. S. Cave, Camb. and King's Coll.; J. G. Chappel, Univ. Coll.; Gladys E. Clyne, Roy. Free; R. H. Dale, Camb. and St. Bart.'s; R. S. Dale, St. Mary's; J. R. Davidson, Univ. Coll.; D. H. Davies, Camb. and Middx.; G. M. Denning, Bristol and St. Mary's; A. R. O. Denton, Guy's; K. C. Eden, Univ. Coll.; T. S. Eddy and A. G. Edwards, Guy's; D. M. Evans, St. Bart.'s; E. W. R. Fairley, St. Thos.; E. L. Fisher, St. Bart.'s; P. S. Fox, Leeds; C. S. France, Manch.; C. M. Fysh, St. Thos.; A. B. F. Gibson, Camb. and St. Thos.; K. D. Gibson, St. George's; V. R. Ginde, Bombay and West Lond.; C. H. Goodliffe, Birm.; G. B. Grayling, Roy. Inf. Leicester; H. A. Hamilton, Camb. and Guy's; M. Hamilton, Univ. Coll.; W. H. C. M. Hamilton, Camb. and St. Thos.; G. R. Hawkes, Camb. and Liverp.; F. Janus, Manch.; F. J. G. Jefferiss, St. Mary's; J. R. R. Jenkins, St. Bart.'s; B. S. Jirge, West Lond.; D. R. Jones, Cardiff; P. G. C. Jones, Guy's; T. E. Jones-Davies, Camb. and St. George's; A. W. Khan, Manch.; M. B. Khan, Leeds; N. F. Kirkman, Manch.; J. L. Lanceley, Liverp.; W. A. Law, Camb. and Lond.; M. C. W. Long, St. Mary's; G. G. Macdonald, Univ. Coll.; E. B. McDowall, Camb. and St. Thos.; J. A. Mansi, St. Bart.'s; R. A. Mathews, Bristol; G. H. Moore, Manch.; R. S. Morris, Camb. and St. Thos.; E. J. Moynahan, Univ. Coll.; Edith A. S. Parry-Evans, Roy. Free; H. F. Patrick and S. H. Pearse, St. Thos.; G. W. V. Pegge, St. Mary's; R. Peters, Univ. Coll.; R. A. Piachaud, Ceylon and Univ. Coll.; T. H. Pierce, Liverp.; M. R. Preston, Middx.; E. J. Pryn, Guy's; R. H. Purnell, St. Bart.'s; S. Ramgoolam, Univ. Coll.; E. A. Richards, St. Thos.; Katharine C. Rogers, Roy. Free; I. Slome, Lond.; K. Soddy, Univ. Coll.; J. Starkie, Manch.; J. Stern and F. G. St. C. Strange, Lond.; J. C. Thomas, Univ. Coll.; Dorothy J. Thompson, Camb. and Bristol; R. C. H. Tripp and R. J. Vakil, St. Thos.; P. A. Walford, Camb. and St. Thos.; S. M. Whitteridge, Guy's; O. C. Wilkinson, Birm.; T. M. Williams, St. Thos.; P. L. E. Wood, Camb. and St. Thos.; R. F. Wyatt, St. Thos.; P. L. Young, St. Bart.'s; and Betty M. Zeal, Univ. Coll.

Midwifery.—A. G. V. Aldridge, Camb. and Birm.; A. W. H. Ashbery, Birm.; R. A. J. Asher, Lond.; G. T. Balean, Guy's; Phyllis M. Ball, Birm.; C. R. Barker, Univ. Coll.; D. Bhatia, West Lond.; A. P. Booth, Lond.; H. S. Brodribb, St. Bart.'s; J. A. B. Burnett, Charing Cross; Margaret M. B. Carey, Roy. Free; R. S. Carpenter, Lond.; Jean M. Cass, Roy. Free; R. C. F. Catterall, Camb. and Univ. Coll.; H. G. Cereseto, St. Bart.'s; J. G. Chappel and S. C. Chatterjee, Univ. Coll.; W. E. Clarke, Charing Cross; W. B. Clegg, Guy's; A. B. Concanon, Liverp.; J. H. L. Conway-Hughes, St. Bart.'s; E. C. Cordeaux, Middx.; F. H. Culshaw and R. H. Dale, St. Bart.'s; J. R. Davidson, Univ. Coll.; D. A. Davies, Guy's; W. J. F. Davies, Cardiff; Bessie Dodd, Liverp.; E. W. Dunkley, Lond.; R. S. Ellis-Brown, Guy's; D. M. Evans, St. Bart.'s; E. W. R. Fairley, St. Thos.; A. Fearnley, King's Coll.; B. W. Fickling, St. George's; A. R. Ford, St. Bart.'s; I. M. Fradkin, Lond.; E. Galinsky, Univ. Coll.; V. R. Ginde, West Lond.; Muriel C. Goodchild, Roy. Free; C. H. Goodliffe, Birm.; B. S. Grant, Lond.; S. A. Greenwood-Penny, St. George's; W. E. Hadden, St. Thos.; H. A. Hamilton, Camb. and Guy's; M. J. Harris, Guy's; G. R. Hawkes, Camb. and Liverp.; G. H. M. Hemsted, St. Mary's; H. F. G. Hensel, Lond.; C. F. Heys, Guy's; K. F. W. [illegible] 's; J. J. V. Hopkins, St. B [illegible] ss; J. H. Hudson, Leeds; [illegible] Human, St. Mary's; B. S [illegible] t. Bart.'s; R. N. Jones, Bir [illegible] R. Kark, Guy's; A. H. Ki [illegible] Coll.; F. B. Lake, Guy's; F. H. Lamb, St. Thos.; M. Lederman, Westminster; A. R. Lee, Sheff.; F. D. M. Livingstone, Camb. and St. Bart.'s; O. Lloyd Middx.; M. C. W. Long, St. Mary's; Christia F. Lucas, Birm.; A. J. McCall, Liverp.; R. McDonald, Guy's; E. B. Z. Masterman, Camb. and St. Bart.'s; J. G. Mathias, Lond.; D. Matthews, Cardiff; A. B. G. Mein, Westminster; R. L. Moody, St. Thos.; G. H. Moore, Manch.; A. Mukerji, Middx.; H. Nagler, Charing Cross; J. G. Nel, St. Bart.'s; W. S. Noble, Guy's; A. R. H. Oakley, Middx.; H. E. Osen, St. Bart.'s; S. Paletz, St. George's; Edith A. S. Parry-Evans, Roy. Free; Mary Paulosky, West Lond.; A. Pearlman, Middx.; A. L. Peers, Guy's; E. J. Perks, Bristol; S. Phillips, King's Coll.; Lillian M. Pickford, Univ. Coll.; G. Pollack, St. Mary's; T. S. Protheroe, Guy's; R. H. Purnell, St. Bart.'s; C. O. Ribeiro, Univ. Coll.; D. T. Richards, Cardiff; S. Roberts, Bristol; Katharine C. Rogers, Roy. Free; M. Rooms and Eileen G. Rose, Leeds; W. T. Ross, Cape and St. Bart.'s; C. R. St. Johnston, Birm.; J. K. Samuel, St. Thos.; L. E. Sealy, Bristol; N. H. Seaton, Univ. Coll.; C. W. T. Shuttleworth, Guy's; J. Simon, Lond.; A. S. R. Sinton, Westminster; T. Smallhorn, St. Bart.'s; A. C. Spence, Camb. and Middx.; F. G. St. C. Strange, Lond.; D. W. I. Thomas, St. George's; J. C. Thomas, Univ. Coll.; M. J. H. Thomas, Univ. Coll.; R. P. Tong, Liverp.; B. M. Truscott, Middx.; J. K. B. Waddington, Liverp.; W. Waks, St. Bart.'s; M. M. Waldman, Westminster; J. St. J. F. W. Wallace-Collett, Lond.; T. J. Walters, St. Mary's; M. Watkins, St. Mary's; F. H. Weston, Dubl. and Guy's; D. O. Wharton, Camb. and Manch.; S. M. Whitteridge, Guy's; O. C. Wilkinson, Birm.; J. G. Williams, Westminster; P. M. Wright, St. Bart.'s; A. R. Yates, Lond.; and Winifred F. Young, Camb. and King's Coll.

University of London

During the period 1934–38 the faculty of medicine will be represented in the senate by Mr. H. L. Eason, M.S. (reappointed), and Dr. A. M. H. Gray. Mr. W. Girling Ball, F.R.C.S., will represent the general medical schools.

University of Birmingham

Dr. Stuart McDonald has been appointed lecturer in pathology in the university. He is at present demonstrator of pathology at the University of Durham College of Medicine, Newcastle-upon-Tyne.

Royal Medico-Psychological Association

The subject of the fifteenth Maudsley lecture, which Lord Macmillan is delivering to this association on Thursday, May 17th, at 3 P.M., will be the Professional Mind. The lecturer is president of the National Institute of Industrial Psychology. The meeting will take place at Manson House, 26, Portland-place, London, W.1.

Epsom College

The Council of Epsom College will shortly award a pension of £30 a year to a duly qualified medical man of not less than 55 years of age. If the candidate is a single man or a widower his income, independent of any allowance from the College or from the Royal Medical Benevolent Fund, must not exceed £100 per annum. Forms of application should be obtained forthwith from the Secretary, Epsom College, 49, Bedford-square, W.C.1, and must be returned completed to him not later than May 30th, 1934.

Tuberculosis Scholarships in Rome

The Italian Fascist National Federation against Tuberculosis has placed at the disposal of the International Union against Tuberculosis six scholarships at the Benito Mussolini Institute in Rome. They are each of a value of 6000 lire, plus board and lodging, and are intended to enable foreign medical practitioners to stay at the institute and follow a course of studies. This stage of eight months will correspond with the academic year (from Nov. 15th to July 15th) interrupted by the usual holiday periods.

The scholarships will preferably be awarded to young physicians who are already familiar with tuberculosis problems, and the kind of work undertaken will be subject to agreement with the director of the institute.

Application should be made through the secretary of the National Association for the Prevention of Tuberculosis, Tavistock House North, Tavistock-square, London, W.C. 1, not later than July 1st.

London School of Hygiene and Tropical Medicine

The 1934–35 course of study at the school, which qualifies students to sit for the University of London diploma in public health, and covers a period of nine months' whole-time work, will begin on Oct. 1st. An open competition will be held on June 28th–29th for the Fishmongers' Company studentship which carries a free place in the course. Applications for this studentship must be sent in by June 18th to the secretary of the school, Keppel-street, Gower-street, W.C.1.

The Langley Memorial prize, of the approximate value of £21, is open to competition amongst officers of the West African medical staff, whether on the active or retired list. The award will be made for the best paper on tropical medicine or surgery; tropical hygiene and sanitation; or tropical entomology and parasitology. Special consideration will be given to original work. Papers must be delivered to the secretary of the school before Oct. 1st.

Royal College of Physicians of Edinburgh

A quarterly meeting of the college was held on May 1st, with Dr. Edwin Bramwell, the president, in the chair. Dr. Francis William Murray Cunningham (Hove, Sussex) was introduced and took his seat as a fellow. Dr. William Lindsay Kinnear (Dundee), Major James Henry Barrett, I.M.S., and Dr. David Rhys Lewis (Swansea) were elected to the fellowship. Dr. Robert Thin was re-elected a representative of the college on the conjoint committee of management of the triple qualification.

It was announced that the Cullen prize had been awarded equally between Sir Frederick Menzies and Lieut.-Colonel A. G. McKendrick.

Medical Tour in Poland

Those joining the medical tour to Poland, which is being arranged by the Royal Institute of Public Health, will leave London on August 2nd, arriving at Danzig on August 6th. A special visit will be paid to Inowroclaw, an inland watering-place with medical baths for dealing with cases of rheumatism, arthritis, and throat disease. On August 7th the party will reach Warsaw, where the hospitals and clinics will be inspected and an opportunity to visit the sanatorium at Otwock will be given. August 8th will be spent in Cracow, and on the 9th there will be a reception by the civic authorities of Gydnia. The party will reach London again on August 13th. Passports will be necessary, but Polish visas will be granted free for this tour. Further information may be had from the secretary of the institute, 23, Queen-square, London, W.C.1.

Research Fellowships in Tuberculosis

The Dorothy Temple Cross research fellowships in tuberculosis for 1934–35 will shortly be awarded by the Medical Research Council. The object of these fellowships is to give special opportunities for study and research to workers who intend to devote themselves to the advancement by teaching or research of curative or preventive treatment of tuberculosis. Candidates must be British subjects and must possess suitable medical, veterinary or scientific qualifications, and preference will be given to those who wish to make their studies or inquiries outside Great Britain. The value of the fellowships awarded will depend upon the standing and qualifications of the candidate, but will not be less than £350 per annum, and they will as a rule be tenable for one year, exclusive of allowances. It may also be possible to award a senior fellowship of considerably greater value to a specially well-qualified candidate who wishes to undertake an intensive study of some particular problem of tuberculosis at a chosen centre of work in another country. Further particulars and forms of application are obtainable from the secretary of the Council, 38, Old Queen-street, Westminster, London, S.W.1. Applications must be made by June 1st.

Liverpool Psychiatric Clinic

The annual meeting of this clinic was held on May 7th, with Dr. W. M. Frazer, medical officer of health for Liverpool, in the chair. The speakers were Dr. Doris Odlum, honorary secretary of the National Council for Mental Hygiene, and Dr. S. Barton Hall, an honorary physician of the clinic. Dr. Odlum spoke on mental health and the community, and Dr. Barton Hall described the work of the clinic during the past ten years. It claims to be one of the first, perhaps the first, psychiatric out-patient clinic to be established outside London; it commenced its activities in 1924 thereby antedating the recommendations of the 1930 Mental Treatment Act, with regard to the establishment of out-patient clinics, by some six years. The experience has been that "in a very considerable proportion not only of the psychoneurotic but of the early mental cases, the problem is amenable to skilled psychological handling and a permanent readjustment between individual and environment can be brought about with some rapidity and without having recourse to measures, such as segregation away from home, which the public are still accustomed to regard as severe." It is hoped that in the near future an increase in trained staff will permit of an increase in attendances at the clinic and will also help to meet the ever-growing demand both for individual instruction and for lectures in psychological medicine.

National Temperance Hospital

The eighth annual Macalister lecture will be delivered at this hospital on Thursday, June 21st, at 9 P.M., when Dr. Robert Hutchison will speak on praise and dispraise of doctors.

Ladies' Medical Golfing Society

The spring meeting was held at Oxhey Golf Club on May 4th, 1934. The results were as follows: Canny Ryall Challenge Cup and Memento: Mrs. McCullagh, 75 net. Division I.—Scratch prize: Miss Dix-Perkin and Mrs. Russell Smith tied at 90. Handicap prize: (1) Mrs. Russell-Smith, (2) Mrs. Relph, (3) Mrs. Perry. Division II.—Scratch prize: Lady Goadby, 100. Handicap prize: (1) Mrs. McCullagh, (2) Mrs. Mortimer Woolf, (3) Mrs. Gardiner-Hill tied with Lady Goadby. Best Ball prize: Mrs. Russell-Smith and Mrs. Bain, 78½. 12 Hole Bogey Greensomes: Miss Sheila Dudgeon and Miss Betty Marriage, all square.

Royal Photographic Society Exhibition

The series of photographs by Lieut.-Colonel F. D. S. Fayrer, I.M.S. retd., now on view at the galleries of the Royal Photographic Society in Russell-square, provides an interesting record of a life spent in India. From the unlimited subjects at his disposal Colonel Fayrer has succeeded in presenting in a very attractive way many impressions of the daily life of India, its architecture, and the varying types to be met with amongst its people. One portrait in particular—No. 7, The Old Havildar—bears a striking resemblance to one of our famous literary men. The exhibition will remain open on week-days until May 31st.

Medical Diary

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

TUESDAY, May 15th.

Special Meeting of Fellows, 5 P.M. General Meeting of Fellows, 5.30 P.M.

WEDNESDAY.

Surgery: Subsection of Proctology. 5 P.M. Annual General Meeting. Surgical Treatment of Carcinoma of the Colon. Discussion to be opened by Dr. Fred W. Rankin (Lexington, Kentucky) and Dr. T. de Martel (Paris). Sir Charles Gordon-Watson and Mr. J. P. Lockhart-Mummery will follow.

THURSDAY.

Dermatology. 5 P.M. (Cases at 4 P.M.) Annual General Meeting. Dr. G. B. Dowling: 1. Localised Myxœdema with Hyperthyroidism. 2. Pustular Psoriasis. Dr. F. A. Silcock: 3. Leprosy: Mixed Nodular and Anæsthetic Type. Dr. Hugh Gordon: 4. Sarcoid. 5. Peculiar Form of Urticaria.

Neurology. 8.30 P.M. Annual General Meeting. Pathological Meeting.

MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W.

MONDAY, May 14th.—8 P.M., Annual General Meeting. 8.30 P.M., Prof. George E. Gask: Clean Wounds, Ancient and Modern (annual oration).

CHELSEA CLINICAL SOCIETY.

TUESDAY, May 15th.—7.30 P.M. (at the Hotel Rembrandt, Thurloe-place, S.W.), dinner, followed by a discussion on Ophthalmic Notes on the Air Force Pilot Overseas, opened by Squadron-Leader P. C. Livingston, R.A.F.

NORTH-WEST LONDON MEDICAL SOCIETY.

TUESDAY, May 15th.—9.30 P.M. (at the Regal Rooms, Finchley-road, N.W.), Dr. H. Avery: Diagnosis and Treatment of Common Gastric Disorders.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE, Manson House, Portland-place, W.

THURSDAY, May 17th.—7.45 P.M., Demonstration. 8.15 P.M., Prof. W. Schüffner (Amsterdam): Recent Work on Leptospirosis (lantern slides).

MEDICAL SOCIETY OF INDIVIDUAL PSYCHOLOGY, 11, Chandos-street, W.

THURSDAY, May 17th.—8.30 P.M., Dr. Alfred Adler: Presidential Address.

ROYAL MEDICO-PSYCHOLOGICAL ASSOCIATION.

THURSDAY, May 17th.—3 P.M. (at Manson House, Portland-place, W.), Lord Macmillan: The Professional Mind (Fifteenth Maudsley Lecture).

ROYAL INSTITUTE OF PUBLIC HEALTH.
MAY 15th to 20th.—Congress at Norwich.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, London, W.

MONDAY, May 14th, to SATURDAY, May 19th.—MAUDSLEY HOSPITAL, Denmark Hill, S.E. Course in Psychological Medicine; afternoons.—ST. JOHN'S HOSPITAL, Leicester-square, W.C. Course in Dermatology; afternoons and evenings.—ST. PETER'S HOSPITAL, Henrietta-street, W.C. Course in Urology for advanced Post-graduates; all day.—MEDICAL SOCIETY OF LONDON, 11, Chandos-street, W. Lecture-demonstration on Anginal Pain, at 2.30 P.M., on Tues., by Dr. A. E. Clark-Kennedy.—PANEL OF TEACHERS. Individual clinics in various branches of medicine and surgery are available daily. Courses of instruction, clinics, &c., arranged by the Fellowship of Medicine are open only to Members and Associates.

KING'S COLLEGE HOSPITAL, Denmark Hill, S.E.

THURSDAY, May 17th.—4.30 P.M., Dr. E. Mapother: Prevention of Mental Diseases.

ST. MARY'S HOSPITAL INSTITUTE OF PATHOLOGY AND RESEARCH, Paddington, W.

THURSDAY, May 17th.—5 P.M., Prof. J. C. Drummond: Vitamins in Relation to Present Day Problems of Public Health.

ST. PAUL'S HOSPITAL, Endell-street, W.C.

WEDNESDAY, May 16th.—4.30 P.M., Mr. Stanford Cade: Radium in Malignant Disease of the Urinary Tract.

LONDON SCHOOL OF DERMATOLOGY, St. John's Hospital, 49, Leicester-square, W.C.

MONDAY, May 14th.—5 P.M., Dr. R. T. Brain: Rodent Ulcer.

WEDNESDAY.—5 P.M., Dr. I. Muende: Essentials of the Pathology of the Skin.

UNIVERSITY OF BIRMINGHAM.

TUESDAY, May 15th.—3.30 to 5 P.M. (at the General Hospital), Mr. A. B. Danby: Pelvic Inflammations of Women.

WEDNESDAY.—4 P.M. (in the Lecture Theatre of the Medical Faculty Buildings), Prof. J. B. S. Haldane: Contributions of Genetics to Medical Science. Second of three lectures.

THURSDAY.—4 P.M. (in the Medical Theatre), Dr. H. Guy Dain: Regulations appertaining to National Insurance Practice (first of two lectures).

FRIDAY.—3.30 to 5 P.M. (at the Queen's Hospital), Prof. Wm. Gemmill: Surgery of the Sympathetic Nervous System.

LEEDS GENERAL INFIRMARY.

TUESDAY, May 15th.—3.30 P.M., Dr. MacAdam: Demonstration of Medical Cases.

MANCHESTER ROYAL INFIRMARY.

TUESDAY, May 15th.—4.15 P.M., Dr. R. S. Paterson: Radiological Investigation of the Spinal Column with special reference to Compensation Work.

GLASGOW POST-GRADUATE LECTURES.

WEDNESDAY, May 16th.—4.15 P.M. (at the Royal Infirmary), Dr. A. M. Crawford: Medical Cases.

Appointments

FARRINGTON, GORDON, M.B. Lond., has been appointed Resident Medical Officer, London Lock Hospital.

FRANKLIN, JOHN L., M.D. Camb., M.R.C.P. Lond., Assistant Physician for Diseases of the Skin, Westminster Hospital.

Certifying Surgeons under the Factory and Workshop Acts: KINGSLEY, A. P., B.M., B.Ch. Oxon. (Burton Latimer, Northampton), and PENMAN, F. V. G., M.B., Ch.B. Glasg. (Dukinfield, Cheshire).

Vacancies

For further information refer to the advertisement columns

All Saints' Hospital for Genito-Urinary Diseases, Austral-street, St. George's-road, S.E.—Res. H.S. At rate of £100.

Ashton-under-Lyne, District Infirmary.—Asst. Radiologist. £300.

Barnsley, Beckett Hospital and Dispensary.—Res. Surg. O. £300.

Bedford County Hospital.—First and Second H.S.'s. At rate of £165 and £140 respectively.

Belgrave Hospital for Children, Clapham-road, S.W.—H.S. At rate of £100.

Birmingham Children's Hospital.—Res. Surg. O., Asst. Res. M.O. £175 and £125 respectively. Also H.P., H.S., and Cas. H.S. Each at rate of £75—£100.

Brighton, Royal Alexandra Hospital for Sick Children.—H.S. £100.

Bristol City and County.—Asst. M.O.H. £500.

Bristol Dispensary.—Two M.O.'s.

Burton-on-Trent General Infirmary.—Cas. O. and H.P. £150.

Cardiff, King Edward VII. Welsh National Memorial Association. H.P. for Glan Ely Hospital. £100.

City of London Maternity Hospital, City-road, E.C.—Asst. Res. M.O. At rate of £80.

Dewsbury and District General Infirmary.—H.S. £150.

Eastbourne, Princess Alice Memorial Hospital.—Res. H.S. £150.

Edinburgh City.—Clin. M.O. for Venereal Diseases Scheme. £750.

Elizabeth Garrett Anderson Hospital, Euston-road, N.W.—Jun. Asst. Path. £250. Also H.P., three H.S.'s, and Obstet. Asst. Each at rate of £50. Also Jun. Obstet. Surgeon.

Evelina Hospital for Sick Children, Southwark, S.E.—H.P. At rate of £120.

Fareham, Hants, Knowle Mental Hospital.—Asst. M.O. £550.

Glasgow, Lightburn Joint Hospital, Shettleston.—Res. Phys. £375.

Hospital for Consumption and Diseases of the Chest, Brompton, S.W.—Director of Radiological Dept.

Hospital for Sick Children, Great Ormond-street, W.C.—H.P. and H.S. Each at rate of £100.

Ilford, King George Hospital.—Deputy Res. M.O. £200. Also H.S. £100.

Italian Hospital, Queen-square, W.C.—H.S. At rate of £100.

Lancaster Royal Infirmary.—Jun. H.S. £130.

Lewisham Hospital, High-street, Lewisham, S.E.—H.P. At rate of £80.

Liverpool Eye, Ear and Throat Infirmary, Myrtle-street.—Hon. Ophth. Surgeon.

Liverpool, Royal Southern Hospital.—Hon. Asst. Gynæcologist and Hon. Laryngologist.

Llanelly and District Hospital.—H.S. £150.

L.C.C.—Temp. Visiting M.O. At rate of £100.

London Hospital, E.—Asst. Director of Medical Unit.

London Fever Hospital, Liverpool-road, N.—Two Asst. Phys.

London Jewish Hospital, Stepney-green, E.—Out-patient Asst. £125.

Manchester and Salford Hospital for Skin Diseases.—Asst. M.O. £100.

Miller General Hospital, Greenwich-road, S.E.—Cas. O. and Out-patient O. Each at rate of £150. Also H.P. and H.S. Each at rate of £100.

Oswestry, Robert Jones and Agnes Hunt Orthopædic Hospital.—H.S. At rate of £200.

Preston and County of Lancaster Royal Infirmary.—H.S. £150.

Queen's Hospital for Children, Hackney-road, E.—Surgeon to Ear, Nose and Throat Dept.

Reading, Royal Berkshire Hospital.—Res. Anæsthetist. At rate of £150.

Rochester, St. Bartholomew's Hospital.—Res. Surg. O. At rate of £225.

Rotherham Hospital.—H.P. £180.

Royal Northern Hospital, Holloway, N.—Res. M.O. £370. Also Clin. Asst. for Dermatological Dept.

Royal Waterloo Hospital for Children and Women, Waterloo-road, S.E.—Hon Physician.

St. Albans, Hill End Hospital for Mental and Nervous Disorders.—H.P. At rate of £200.

St. Giles' Hospital, Brunswick-square, Camberwell, S.E.—Asst. M.O. £350.

St. Helen's Hospital.—Jun. H.S. £150.

St. Mary Abbots Hospital, Marloes-road, Kensington, W.—Asst. M.O. £250.

St. Mary's Hospital, W.—Cas. H.S. At rate of £100.

Salford Royal Hospital.—Two H.S.'s. At rate of £125.

Sheffield Children's Hospital.—H.P. At rate of £100.

Sheffield, Jessop Hospital for Women.—H.S. to Maternity Dept. At rate of £120.

Weir Hospital, Grove-road, Balham, S.W.—Jun. Res. M.O. £150.

West London Hospital, Hammersmith-road, W.—Hon. Dermatologist. Also Hon. Asst. Anæsthetist.

Wolverhampton Royal Hospital.—H.S. Also H.S. to Ear, Throat and Nose Dept. Each at rate of £100.

The Chief Inspector of Factories announces a vacant appointment for a Certifying Factory Surgeon at Lesmahagow, Lanark.

Births, Marriages, and Deaths

BIRTHS

BATEY.—On May 2nd, at 64, Holland-park, W., the wife of Maurice Batey, L.D.S. R.C.S. Eng., of a son.

TAYLOR-YOUNG.—On May 3rd, at The Red House, Park-lane, Salisbury, the wife of H. S. Taylor-Young, F.R.C.S., of a son.

MARRIAGES

BRANDON—MITCHELL.—On April 30th, in St. Giles' Cathedral, Edinburgh, William J. M. Brandon, F.R.C.S. Eng., to Grizel M. J., youngest daughter of the late J. C. Mitchell, M.B., D.Sc., Johannesburg, and Mrs. Mitchell, Sundial, Gilmerton, Midlothian.

DEATHS

EVANS.—On May 3rd in London, Idris David Evans, M.D., B.S., Barrister-at-Law, Deputy-Coroner for Central London.

KIRK.—On May 3rd, at Southgate, N.14, James Kirk, M.D. (late of Straits Settlements and Bridlington), in his sixty-seventh year.

McCLURE.—On May 3rd, James Campbell McClure, M.D., Chevalier de la Légion d'Honneur, of 65, Wimpole-street, W.1.

TIMMS.—On May 5th, the result of an accident, Samuel Day Timms, L.D.S. R.C.S. Eng.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

NOTES, COMMENTS, AND ABSTRACTS

THE THYROID AND LYMPHATIC LEUKÆMIA

THE striking resemblance between the symptoms of hyperthyroidism and of those of chronic lymphadenosis was noted originally in 1924 by G. R. Minot and J. H. Means. Irritability, agitation, hyperactivity, asthenia, increased sweating, and loss in weight, associated with a warm moist skin, a rapid pulse, and fine tremor of the hands, are found in both diseases. In both there is a raised basal metabolic rate, and improvement in both may result from treatment with Lugol's iodine solution. Dameshek, Berlin, and Blumgart have now reported (New Eng. Jour. Med., April 5th, 1934, p. 723) a case of "aleukæmic lymphatic leukæmia" in which apparent recovery followed complete thyroidectomy. The patient was a woman of 42; her spleen occupied almost the entire left half of the abdomen and the glands were also enlarged. The total white cell count was at its maximum 10,000 per c.mm.; the percentage of lymphocytes, most of which were of the immature type, was about 60; and there were about 20 per cent. of blast cells thought to be lymphoblasts. The basal metabolic rate was constantly in the neighbourhood of plus 60. Treatment with X rays and iodine was without effect, but after thyroidectomy the basal metabolic rate immediately fell to normal levels, and the clinical signs and symptoms of hypermetabolism disappeared. The lymph glands and spleen regressed about 90 per cent. from their original size, and all immature cells disappeared from the peripheral blood. The patient said she felt "wonderfully well." The authors recognise that remissions have frequently been reported in lymphatic leukæmia and that the effects recorded here may merely be due to such a remission, but the rapid onset of improvement after operation suggests that thyroidectomy was at least partly responsible.

Those in search of other references to this relationship will find the relevant observations briefly set out in a paper on the influence of the endocrine system in blood disorders by Dr. Douglas Hubble published in our issue of July 15th last year. Hubble concludes that it is a reasonable working hypothesis that the thyroid gland is disordered in chronic lymphatic leukæmia. "This is an assumption," he adds, "which, notably by Friedgood's research, has been brought to the edge of certainty."

NESTS FOR NON-PREGNANT RABBITS

THE private life of the rabbit, like that of Henry VIII, has been known to excite unfavourable comment, but Mr. C. W. Bellerby[1] has recently described a naïve and charming practice of the normal œstrous doe which may be considered creditable. Shortly before parturition the captive pregnant rabbit makes a nest by plucking fur from her breast, abdomen, and flanks and using it to line a hollow in a corner of the cage. Mr. Bellerby, whose laboratory in the department of social biology of University College, London, maintained a colony of 90 isolated, unmated, female rabbits, observed that during the spring the fond creatures were frequently making nests. Pseudo-pregnancy is not unknown in isolated does as a result of spontaneous ovulation, and he thought at first that this phenomenon must be occurring unusually often, but the results of a few post-mortems convinced him that this was not so. He began to watch his rabbits closely: "cages were scrutinised with the utmost care first thing every morning, any nest found being removed after examination." He began his investigation on April 1st, 1932, and narrowly escaped closing it on the same historic anniversary by ceasing observations at midnight on March 31st, 1933.

Among ten animals killed at different times during the year, pseudo-pregnancy occurred in only one, so that clearly most of the does had not even this much excuse for their behaviour. By far the greatest number of nests were made in the spring and none at all in the cold months. Hysterectomy did not check their activities; indeed not only was nesting more frequent in a series of 15 hysterectonised rabbits, but successive nest building by the same doe occurred far more often. About half the normal œstrus females practised nest building. No ovariectomised animal was seen to make a nest, so that ovarian secretion appears to be essential to their development of this instinct; this would account for the seasonal variation, because ovarian activity in the rabbit is greatest in the spring. Hysterectomy has been shown in the rabbit and guinea-pig to prolong the life of the corpus luteum of pseudo-pregnancy; Mr. Bellerby thinks it possible that hyperactivity of the ovary may follow hysterectomy, rendering the doe more sensitive to the stimuli, whatever they are, which provoke nest-building. There is something touching about the whole picture; presumably if Mr. Bellerby's does were human they would run a creche. We learn anyway that "these observations are entirely in accordance with the work of Weisner and Sheard (1933), who have found that maternal behaviour in the rat is not necessarily dependent on the formation of the corpus luteum."

LEWIS'S CATALOGUE OF BOOKS

WE have received from H. K. Lewis and Co., Ltd. (136, Gower-street, London, W.C.1), a second supplement to the catalogue of their Medical and Scientific Lending Library. This covers the years 1931 to 1933 (Price 2*s.*; to subscribers 1*s.*), and along with the first supplement (1928–30) forms a complete guide to the books in the library and incidentally a useful index to contemporary medical literature. For this purpose the value is greatly enhanced by a classified index of subjects, with the names of those authors who have written upon them. The catalogue is a further instalment of the firm's intention, expressed at the opening of their new building three years ago, to make the pathway between the producers and the consumers of books as smooth, as easy, and as inexpensive as possible. The catalogue bound up with both supplements is priced at 16*s.* (to subscribers 8*s.*).

VETERINARY SURGEONS

THE Register of Veterinary Surgeons for 1934 which has just reached us from the Royal College of Veterinary Surgeons (10, Red Lion-square, W.C.1, price five shillings), contains the names of 3379 members, a decrease of 14 on the number for the previous year. The number of students who presented themselves for examination at the College during the year was 898, of whom 57 per cent. satisfied the examiners, and there were 664 individual students examined in the year as compared with 488 in the previous year. The Register contains amongst other things a copy of the by-laws including the provisions of the supplemental charter of May 18th, 1932, which gave the College power to institute new post-graduate diplomas in tropical veterinary medicine and other branches of veterinary science, but in future years a separate volume is to be issued containing the Register only. The standard of production has vastly improved of recent years, and the Register as now issued is pleasing in form and substance.

DEMONSTRATIONS OF CONTRACEPTIVE TECHNIQUE.—On May 16th, at 2.30 P.M., a demonstration will be given by Mrs. Marie Stopes, D.Sc., and Dr. Evelyn Fisher, at the Clinic for Constructive Birth Control, 108, Whitfield-street, London, W. Application for tickets (which will be supplied to medical practitioners only) should be made in writing to the hon. secretary at the clinic.

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[1] A Type of Maternal Behaviour in the Normal Œstrous Female Rabbit. By C. W. Bellerby, Quart. Jour. Physiol., 1934, xxiv., 77.

ADDRESSES AND ORIGINAL ARTICLES

MACHAON, OR THE FUTURE OF SURGERY*

By Geoffrey Keynes, M.D. Camb., F.R.C.S. Eng.
ASSISTANT SURGEON, ST. BARTHOLOMEW'S HOSPITAL

Some twelve years ago, while reading Parker's short "History of Surgery in Great Britain," I was struck by the immensely important part that war had played in the development of the craft of surgery. The god-like Machaon, son of Æsculapius, was the first military surgeon who has found a place in literature, his services to the Greek army during the Trojan wars having been celebrated by Homer in the Iliad. Since Machaon's time other surgeons have played their important parts in the unrecorded history of the innumerable conflicts with which humanity has punctuated its progress through the ages, and in historic times a surprising number of the great names in surgery are discovered to have been those of individuals who for a greater or lesser part of their careers were serving the armies of their countries.

Surgery and War

It is unnecessary to enter upon a list of all early military surgeons. Ambrose Paré, taken as the type, was one of the greatest surgeons of all time, and almost the only great surgeon of the sixteenth century, created a revolution in the practice of military surgery. The scales of orthodoxy fell from his eyes when he saw that the condition of the wounded soldiers who had been treated by the surgeons was on the whole worse than those who had not been treated at all. He accordingly abolished the fashionable boiling oil dressing and substituted dry dressings. He reintroduced the use of the ligature instead of the cautery for hæmostasis in amputation. He invented the use of the artery forceps as an aid to the application of the ligature. Paré's great textbook of surgery was translated into several European languages, and was a standard work for the greater part of the seventeenth century. Meanwhile in this country, Woodall, as the result of experience on the field of battle, invented in the early part of the seventeenth century the modern trephine with its centre-bit, and Wiseman, serving with the Cavalier armies during the Civil war, gained the wide experience which enabled him to write his classical "Chirurgical Treatise," published in 1676. Wiseman was the last of the great English surgeons to be trained in war, but in his writings he had laid the foundations on which solid progress could be built. The surgeons of the Napoleonic wars, the Peninsular war, and the Crimean war all added their contributions. Larrey introduced the plaster bandage and the many-tail bandage. Guthrie used the straight splint for fracture of the femur, and practised ligature of both ends of large arteries at the site of injury. Gamgee popularised absorbent and antiseptic dressings. Spencer Wells invented the hæmostatic forceps which bears his name and first used it in the Crimea. During the latter part of the nineteenth century war played a less conspicuous part in the development of surgery, but this brief catalogue of names will help to strengthen the thesis with which I opened my remarks.

The reason why war has exercised so great an influence on the craft of surgery is very plain to see. The earlier surgeons were necessarily occupied largely with the surgery of injuries, with repairing the damage done by arrows, spears, and slings, with amputating limbs, with the treatment of lacerated wounds, and with relieving depressed fractures of the skull. Until the advent of anæsthetics and asepsis, surgery had but small application in civilian practice, and consequently the military surgeons were in the ascendant, and the lines of their advance were limited to those prescribed by the necessities of war.

It is perhaps depressing to reflect that the advance of surgery, the noblest of the crafts, has been so intimately related to the most vicious and cruel of mankind's activities—namely, his desire to destroy his fellow creatures. But it is consoling to realise that the two greatest advances of all, anæsthetics and asepsis, owed nothing to the stimulus of war. Nevertheless it seems to be true to say that the future course of surgery will be largely shaped by events that have only recently taken place, for the reverberations of the greatest war of all have scarcely begun to die down in the world of surgery. I have purposely, therefore, not included the Great War in reviewing the past, for while it adds strength to my thesis it belongs in a surgical sense to the future. We can still hardly guess what will be the ultimate effect on surgery of the million tragedies enacted on the battlefields of France and Flanders. Possibly the surgical millennium will be attained without the necessity for such another cataclysm to stimulate the brains and hands of surgeons to advance their craft, the momentum given by the Great War being sufficient to carry surgery along for many years yet, particularly on certain lines presently to be considered.

Also it seems unlikely that the surgery of injuries, especially of fractures, will soon fall into the background of knowledge. Ever since the war the motor-car has provided a continually increasing number of victims on whom the surgeon may practise his skill, until the number of casualties occurring every year in a large country such as the United States of America exceeds those of any lesser war. These casualties are so scattered that they do not provide the opportunity for mass experience such as results from the organised treatment of the wounded during war, but at least they keep the lamp of knowledge alight—and this is the only crumb of comfort that we can derive from contemplation of what newspapers call "the toll of the road."

The Modern Development of Surgery

Modern surgery has become a technical process so refined in comparison with the rough-and-ready carpentry of our predecessors that some of its practitioners seem inclined to exalt it almost to the position of one of the fine arts. But although the practice of surgery demands the exercise of judgment as much as of skill and a full appreciation of human relationships, yet it contains in it nothing creative, and it remains the noblest of the crafts. Many surgeons are, indeed, in love with surgery, and some seem to feel almost like high-priests officiating at a sacrificial altar. But it is necessary to remember also the feelings of the victims. Very few patients love surgery; all of them, in fact, except a few with psychological abnormalities, hate surgery, and many do not scruple to say so, however grateful they may feel for the benefits they have received. To all but the most educated minds, surgery is only another name for a "cutting operation," and that is a thing engendering the sense of fear. The ordinary mind, therefore, shrinks from surgery, and often puts off invoking its aid until circumstances have forced the issue. It is often the patient, through delay, who is responsible for the failures of surgery, and the real advance of surgery depends almost as much upon the education and collaboration of the patient as upon the technical improvements of the craft. It is evident, therefore, that to the lay mind the apotheosis of surgery will not be the performance of some difficult process requiring exquisite skill and great judgment, but the total abolition of the necessity for any surgery at all. Fortunate it is that the race of surgeons is, on the whole, a race of honest and disinterested men. Their aim is indeed the perfection of technical processes so long as the need for such processes exists; but most do not hesitate also to abandon their operation and their pleasure in its skilful performance when the necessity for it has clearly disappeared. It is only human nature asserting itself if there is a slight lag in this abandonment in the face of the large rewards that even now await the skilful, and, I fear, sometimes the dishonest, craftsman. It may be that the advance of surgery towards its annihilation would be slightly accelerated by the standardisation or abolition of fees for individual operations, but that is a larger question involving social politics. I wish rather to examine the lines upon which surgery is likely to proceed in development as a technical and highly specialised process.

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* An address delivered to the Royal Medical Society at Edinburgh on Feb. 9th, 1934.

SURGERY AND THE SCIENCES

The rise of surgery during the last 75 years has been so rapid that some of its votaries have become dazzled with their own brilliance. Out of this bedazzlement has repeatedly arisen the announcement that surgery has reached its zenith, and that no further developments of importance are to be expected of it. But any such pronouncement is rash and premature. Who can say what startling innovation may not suddenly arise from advances in the physical sciences, to name only one of the possible sources of benefit to surgery? For many years Harvey Cushing, practising cranial surgery at Boston, regarded a certain form of brain tumour as inoperable owing to the hæmorrhage which would follow its removal. Physical science then introduced the electrical coagulating and cutting current, finely adjustable at will. Soon afterwards Cushing was recalling those of his previously condemned patients who remained alive, in order that he might now safely remove these tumours, while controlling hæmorrhage with the coagulating current. He must have felt almost the same satisfaction as did Paré or Spencer Wells when they first procured hæmostasis by methods which were refinements compared with those of their predecessors. The cutting and coagulating currents are now rapidly coming into use and to some extent displacing "the knife." There are theoretical and practical advantages in sealing the lymphatics and small blood-vessels as the operation proceeds. Time is saved and loss of blood stopped; local dissemination of a cancer by the operation is probably prevented; and it may be safely predicted that electricity will have a considerable part in the future of surgery, for electrosurgery is only in its infancy.

The Legacies of War

This is, however, only an example of an adjunct to surgery drawn from a pure science, and its effect on surgery is indirect. The Great War, as I have already suggested, has left many legacies of surgical value, the end of which cannot be foreseen. The knowledge of fractures and their treatment that we possessed before the war seems now to have been absurdly inadequate. Our standards of results were much too low, our splints were primitive and many of them unmechanical, our methods of treatment much too static. With the innumerable gunshot fractures of the war and with minds like that of Sir Robert Jones to work upon the problems that resulted, a huge body of knowledge and experience quickly accumulated. Older methods and materials were discarded, the principle of traction began to assume its proper place, and a revolution in orthopædics was brought about. It may be said that the force of this war-time change is now spent; yet the post-war period has seen the introduction of novocain anæsthesia in the reduction of fractures, and of the various improvements in methods of fixation used by Bohler and his school. Fracture technique is, in fact, still advancing rapidly both on the continent and in this country. Also it must be remembered that it takes time for a new generation of orthopædic surgeons to arise, surgeons who are fully free to practise the newer methods and to justify them by their results. It may be that the advance in orthopædics will grow slower as the years pass, but it seems unlikely to die away for many years to come. In the meantime orthopædics might seem to be losing almost more than it gains, for few branches of surgery can have suffered more pruning as a result of the activities of the pure scientist and of the Ministry of Health. No longer are our hospitals infested with the victims of rickets and surgical tuberculosis. Heliotherapy and diet factors have dealt severe blows at the orthopædic clinic, and although unemployment has delayed this part of preventive medicine it is only a matter of time until surgery almost ceases to know these preventable diseases.

PLASTIC SURGERY

Another familiar example of the legacies of war is the advance of plastic surgery. Many of the principles had been known for centuries, but never before had there been quite the same pitiful appeal from thousands of the disfigured. It seems likely that here the limits of advance have been comparatively soon reached, and I should not anticipate that the future holds very much more in that direction. Already the sardonic observer may affect to notice a falling-off in the supply of legitimate grist for the plastic mill, and a tendency for it to emulate the mysteries of the beauty parlour. Face-lifting, and operations for the relief of abdominal obesity or for reducing the breasts to the dimensions demanded by the dictates of fashion, these all have their place. Call it æsthetic surgery if you will—it is not the highest form of our craft, but at least it is ministering to the (supposed) needs of one section of humanity. Fortunately the problem of the hare-lip has directed the attention of plastic surgeons to its frequent concomitant, the cleft palate; for there, if anywhere, was a field for gentle persuasion and refined technique, instead of the horrible crushing and mangling of infants that was formerly practised under the protection of the names of Brophie and his followers. The grafting of skin is an everyday affair, and a variety of methods are at our command, including the fascinating process of inlay graft. Even the grafting of a whole cornea has been successfully accomplished. The grafting of organs, even of the smallest, has been hitherto unsuccessful. Attempts have been made with the parathyroid gland, the adrenal gland, and fragments of the thyroid gland, but although temporary effects have been noted while the grafted tissue was undergoing absorption, there is, as far as I know, no proved example of a grafted organ having undergone true growth in its new host. The plastic surgeon may perhaps turn his attention in the future to the extremely difficult technical problems of grafting of organs or even of limbs by means of accurate suture of blood-vessels. We may not expect to see a repetition of the miracle of St. Cosmas and St. Damian when the lower limb of a dead Moor was grafted on to the body of a Christian, but it may well be that the surgery of the future holds some technical surprises of that kind in store.

Probably the science of tissue culture will help to throw some light on the problems involved. Clearly successful grafting depends for its success on many factors controlling growth and repair of which we have but the foggiest understanding at the present time. Tissue culture is the only line of research which is likely to help in this direction, and it may indeed prove of unexpected service to surgery in general, for every surgical operation is an experiment testing the capacity of the body for carrying out repairs, and some of our failures may be due to our ignorance in this branch of biological science.

The Growing Edge of Surgery

Any mention of the legacy of war must lead us inevitably to what is at the present moment the most conspicuous "growing edge" of surgery—namely, the surgery of the thorax. With knowledge of the treatment of gunshot wounds of the thorax came a rapid advance in the general surgery of the thorax, though this is restricted for the most part to dealing with the thoracic wall and the lungs. Assaults are continually being made upon what are almost the last strongholds of the body, the mediastinum and the heart itself, but progress here is slow. Cutler's experiments in endocardiac surgery seemed ten years ago to be about to blossom and bear fruit; but the disconcerting discovery followed that the mitral stenosis which the division of the sclerosed valves was designed to relieve was responsible only in a minor degree for the patient's disabilities. Usually the heart muscle was irretrievably damaged by toxic poisoning, so that the successful performance of an ingenious and dangerous operation produced little or no improvement in the few patients that survived. Also one of these few patients, after living a few years, recently died from other causes, and it was found at the post-mortem examination that actually the valves never had been cut at all. Many attempts have been made to treat carcinoma of the œsophagus in the mediastinum; but the operative mortality remains in the neighbourhood of 100 per cent. Surgery must expect to receive an occasional set-back of this kind, and the bolder spirits will not be discouraged. For instance, Prof. Grey Turner, of Newcastle-on-Tyne, has recently recorded the successful extirpation of a carcinomatous œsophagus with subsequent provision of a new external channel, formed partly of a tube of skin and finished off with a short length of small intestine, through which the patient is now merrily swallowing beef-steaks and beer. It may be taken as a general axiom in the march of surgery, that "the nearer the heart the slower," but it is within the thorax that some of the most important hopes for the future of surgery lie. It was at one time thought that the thorax would yield its secrets as readily as the abdomen had done, but it is being realised that the physiology and mechanics of the thorax are much more obscure, and that surgery in the thorax will always have to work on a narrower margin of safety than in the abdomen. No facile analogy between the two will really represent the facts. The thoracic surgeon to attain full competence will have to add familiarity with the use of the bronchoscope and œsophagoscope to his repertory, and to be in the fullest sympathy with the problems confronting the anæsthetist. Already lobectomy for bronchiectasis is becoming an operation of repute, and further developments will surely follow.

THE SYMPATHETIC SYSTEM

Another conspicuous point in the growing edge of surgery is the surgery of the sympathetic system. It is interesting to note how from small beginnings made a few years ago, a considerable body of valuable observations has now been accumulated—although the foundations were laid largely on fallacies! It is generally realised now that Leriche's operation of peri-arterial sympathectomy and Royle's operation of ramisectomy for spastic limbs were based on faulty premises and observations. Yet the work of these pioneers has borne excellent fruit, and to-day, as a result of advances made with the help of the anatomist and physiologist, the various forms of ganglionectomy constitute an important branch of surgery which is certain to develop further in the future.

The foregoing are examples of something that will be added unto surgery, probably in the near future. But, taking the long view, it seems probable that in the end surgery will be gradually shorn of many of her glories, and will ultimately have to take a back seat as an unimportant branch of something else. A considerable part of my personal interests centre in the surgery of the thyroid gland, but I recognise that the thyroid harvest will not be gathered for ever. When a fuller elucidation of the pathology of simple and toxic goitre and the relationship of the thyroid to the other endocrine glands has been achieved, it is likely that surgery will be almost entirely eliminated. At the present moment the thyroid surgeon can in a short time virtually cure the majority of his patients with toxic goitre, because he is able to snap suddenly one of the most important links in the vicious circle that maintains the disease. The patient is not really cured by this rather savage form of treatment, but is enabled to live at so different a level from what she was at before that she is "cured" by comparison. It is improbable that in 50 years' time anything so crude as surgery will be used to relieve the endocrine complex known as toxic goitre. Total thyroidectomy is now being practised for the treatment of heart failure: I cannot regard it as an advance in surgery.

The Cure of Cancer

That is perhaps only a small and simple example of what is going to happen to surgery. The obvious and larger problem is what relation will the surgery of the future bear to the greatest of all human scourges, cancer. So large a proportion of surgical activity is taken up with cancer that its removal from the sphere of surgery would cause an enormous hole in the surgeon's day. Moreover, it appears to me that if this is ever to happen at all it will happen suddenly, and surgery may be caught unawares and find herself smiting at a vacuum. It seems fairly clear that the cancer problem is a biological one connected with an abnormality of growth or with a process of repair gone mad. It is a loss of control of cell division, which can be initiated by the action of specific chemical substances. So precise has knowledge on this point recently become that pure chemical compounds have been synthetically produced, which can be made to cause a carcinoma or a sarcoma in an animal in a given time almost with complete certainty. These substances have complicated molecules, always containing the benzine ring, and have actually been made from other compounds which occur in the human body. The cancer problem is therefore partly a biochemical one, and the process of experimental cancer production is so nearly perfected that the successful reversal of the process may not be so far distant as we are often inclined to suppose. Surgery can often deal successfully with the primary cancerous growth when it is accessible. It is by the inaccessible parts of the disseminated disease that we are so constantly defeated. Cancer disseminates by the circulation, whether it be by blood-vessels or lymphatics, and perhaps it is by the same route that it will ultimately be attacked, particularly if a biochemical cause leads to the discovery of a biochemical cure. The "cancer cure," in fact, if and when it arrives, may be applied *through the circulation, and since all forms of cancer* appear to be closely related the same principle will apply to all of them. Once, therefore, the goal is reached a large part of surgery as we know it may be rapidly eliminated, and the surgeon be replaced as far as cancer is concerned by the vein-puncturing expert. Those surgeons who are sufficiently adaptable may be able to add the biochemical method to their repertory, for after all it will still be the surgeon who will make the diagnosis and have much of the responsibility for the treatment of the patients. Those who cannot so adapt themselves will have to rejoice with the rest of mankind as best they may, though finding a large part of their occupation suddenly removed.

It may be a long time yet before this desired consummation is achieved. But even in the meantime surgery is finding that gradual encroachments are being made on the cancer field, which was so peculiarly hers. I have borne some part myself in aiding and abetting this encroachment so that perhaps I am a biased witness; but it seems clear enough to me that radiology has virtually abolished pure surgery in cancer of the tongue, mouth, and pharynx, in cancer of the skin, anal orifice, and cervix, and in rodent ulcer. I hold unorthodox and perhaps unacceptable views on the value of radium in carcinoma of the breast, for as far as I am concerned the use of radium, or of radium combined with conservative surgery, has almost eliminated the radical operation. But this view, right or wrong, is at any rate an indication of the trend of events, that is, a gradual narrowing of the surgical circle which until recently so completely surrounded the Tree of Cancer. Radiology has at present scarcely any application in cancer of the alimentary tract, but this process of encroachment will not stop, and perhaps in the end it will be the radiologists and not the surgeons who will receive the rudest shock from the cry that "Cancer is Conquered."

There can be few departments of surgery in which technical refinement, both diagnostic and operative, has advanced more in recent times than in cranial surgery. It seems unlikely that the future will see further rapid strides, and even if it does, cranial surgery is but a relatively small department of the craft. It is highly specialised and can never be the concern of more than a few surgeons at any one time. It demands, however, the very highest type of practitioner. He must bring to his surgery a profound knowledge of physiology and neurology. He must be diagnostician as well as craftsman, and it is all these qualities which we shall demand of the few that we shall deem worthy in the future to practise surgery on our heads. This is indeed the ideal for all surgeons, to be as well versed in the science of their craft as in its technical performance, and it may be that, as surgery becomes a more restricted field, a higher and higher general standard will be expected.

Anæsthetics

The ordinary person's horror of "the knife" is equalled, and frequently exceeded, by the same person's horror of the anæsthetic. Already, if only the ordinary person could be made to realise it, most of the terrors of anæsthesia have been dispelled. The ordinary person's horror is made up of a conviction that she (though often he) will never wake up again, of a fear that the operation will be begun before she is unconscious, of memories (if there has been a previous experience) of the rubbery smell of the mask and of the feeling of suffocation and helplessness when the thing is on the face, of the smell and taste of ether, and, lastly, of the misery of vomiting and coughing with a painful abdominal wound. Modern methods of anæsthesia have already gone a long way towards eliminating these various sources of unhappiness in the patient. The use of the different narcotic drugs, such as nembutal, avertin, and sodium evipan, have made it unnecessary for any patient to know anything about the process of induction of anæsthesia. The use of local anæsthesia, spinal anæsthesia, and gas-and-oxygen have, at any rate in my own practice and doubtless in that of many others, largely eliminated ether and chloroform. It cannot be too widely known that both these drugs are to be regarded as poisons, particularly to the liver, and there can be no question to my mind that they should be encouraged gradually to drop out of use.

Often it is urged that it is wrong to use these improved methods in the teaching hospitals because when the average student gets out into the world and becomes the average practitioner he will find that circumstances force upon him the use of the older, and sometimes the simpler, methods. To some extent this is true, and it is undoubtedly the duty of the medical schools to teach *all* methods. But equally it is the duty of the medical schools to be in the van of progress, for only by the education of the young can general standards be raised in the long run. The student must always be shown the best, so that his almost inevitable fall into the rut of complacent routine may be delayed as long as possible. Education must be keyed up to the liveliest minds, not keyed down to the dullest in the matter of anæsthetics as in everything else. Thus, and thus only, will progress in the general world of surgery be accelerated. The effect of it is everywhere to be seen in the continually improving equipment of hospitals, great and small, throughout the country, and in better knowledge of how to use it for the advantage of the ordinary patient. The surgery of the future must seek to temper the wind more and more to this same ordinary patient. The surgeon will think less of his own prowess and more, ever more, of the sufferings of the patient. Even so familiar a thing as post-anæsthetic vomiting will not be taken as a matter of course, because it is nearly always avoidable. Progress in surgery implies not only increased technical proficiency on the part of the surgeon, but less pain and greater safety for the patient. It is clear that the anæsthetic question is closely bound up with this, and so good a beginning has been made with the methods I have mentioned that further improvement is bound to follow. Knowledge on the part of the patient that anæsthesia has no terrors makes for confidence. Confidence produces increased willingness in the patient to coöperate, and so leads directly to earlier diagnosis, earlier treatment, and better results. I therefore believe most firmly that the future of surgery lies to an important extent in the hands of the anæsthetists, and so of the chemists and pharmacologists to whose researches the whole of our recent progress in this line is primarily due.

I have indicated one or two major directions in which surgery in the future is likely to be curtailed. It is possible to enumerate many minor fields in which the same process is visible. Already the syringe has eliminated a great deal of minor surgery, such as most of the operations that used to be done for varicose veins and internal hæmorrhoids. The holocaust of tonsils still goes on, but there are signs that even here a change is beginning to appear, and it is not impossible that improved hygiene or the science of endocrinology, or both together, may eventually eliminate a large part of the lymphoid surgery that employs so many hands so profitably at the present time. The abdominal tonsil, on the other hand, shows no sign of a decline in popularity. The causes of appendicitis I believe to be many, and that anyone who thinks it will be prevented by dieting, or by regulation of the bowels, or by any one measure, is likely to be disappointed.

In many provinces of surgery there is that mysterious pendulum which swings so relentlessly to and fro. It is swinging at the present moment against the surgery of the upper abdomen in the treatment of gastric and duodenal ulcer, and no doubt it will in due course return as the tide of perforations and relapses after medical treatment begins to rise again. The time, so much desired, when the ætiology of ulcers is so well understood that they can be prevented seems still to be distant, and knowledge of how to treat them is therefore still essential. It is difficult to see how surgical ingenuity can devise many more variants of operative treatment, but the surgeon of the future may have formed a clearer idea than we have at the present moment as to exactly which is the best procedure to adopt—gastro-enterostomy, pyloroplasty, gastro-duodenostomy, partial gastrectomy, excision of the ulcer, and so forth.

The Follow-up System

Clear ideas, however, can only be attained by the acquisition of a large body of accurate statistical evidence, and this brings me to the mention of an important influence on the future trend of surgery which is certain to gain in strength as time passes—namely, the "follow-up" method of investigation. Surgery in the past has too often been content to muddle along without any clear guidance from the proved evidence of results. At the same time members of the surgical profession have often expressed discontent with the attitude shown by official scientific bodies, especially by the Royal Society, towards surgery. They have seemed to deny to surgery any scientific status, and I doubt whether even now our profession appreciates the underlying reasons for this. I am afraid the scientist has only too much grounds for regarding the surgeon as a skilled carpenter, as a man who likes carrying out experiments on the human body, but is not interested in the results. This attitude is the absolute negation of the scientific method, and is partly the cause and partly the effect of the chief weakness of many surgeons, that is, their great confidence in their own opinions. Most surgeons will deny that they are indifferent to the results, or alternatively plead that there is no time in the surgeon's day for the following-up of patients. This plea may excuse but does not justify indifference to scientific method; it merely shows the necessity for better organisation of surgical practice. The "follow-up" departments which are appearing in many centres, will, I believe, make a very big contribution to the progress of surgery, and tend to remove the aspersion on the surgeon of an unscientific approach to his problems. Erroneous "impressions" formed by individuals will be replaced by wider and more accurate information based on the histories of patients for a long period after their operations. Survival rates for a minimum of five years after treatment will be an essential basis for assessing the success or failure of any method used in the treatment of cancer. At the present time very few surgeons know even the number of recurrences that take place after their operations for hernia. Many of them believe there are no recurrences, but this is merely an agreeable ignorance of facts which can only be ascertained by a "follow-up" department. It is true that the compilation of statistics introduces a new difficulty—that of their interpretation, but I do not believe that it is beyond the wit of man to overcome this difficulty with thought and experience. Also the follow-up principle does not depend solely on statistical information for its value. If it compels the surgeon to see his patients at intervals for a long time after treatment, and to know beyond a shadow of doubt when they are dead, it will have performed a useful function. The scientific surgeon of the future will not depute his follow-up work to a junior assistant, but will see his successes and his failures with his own eyes. He may sometimes be a sadder and a wiser man, but at least he will be better able to interpret his statistics intelligently and to know when he is being misled by the pure statistician.

Standardisation and Mass Production

The general trend of human affairs at the present time is set strongly towards standardisation and mass production. Both eugenic principles and political theory favour the production of a standard man, and the time may come when all except standard men will be thrown away, a few non-standard individuals being kept, perhaps, as material for research. Surgery has hitherto kept its status as a pure handicraft—aided, it is true, by an increasing number of instruments of precision, but a handicraft it remains, aloof from politics, apart from the industrial revolution and mass production. But can we be sure that this blessed state can be indefinitely maintained? Does not a glimpse into the future induce a nightmare vision of standard operations being performed by machinery on standard men? This would tend to eliminate automatically those individuals not conforming to the standard, and so to accelerate the realisation of the eugenic ideal. Perhaps it might be permissible to offer in special circumstances and at an enhanced price an old-fashioned operation performed manually and finished with a special hand-sewn scar. Fortunately it seems to be impossible that anything so awful can ever take place, and the surgeon may look forward to a long-continued demand for the sheer skill of his naked hands (naked except for rubber gloves) in the service of suffering humanity.

I have necessarily given a very superficial survey of the future of surgery for the field is so wide and the possibilities so great. But it is wholesome occasionally to stop and survey the situation, even superficially, and think whither it may be leading us. It may be true that consideration of the past and how we got here is more valuable than speculation on the future. It is certainly true that the past does shed much light on the conduct of the present, and it should correct all those who through ignorance of the past, through an overweening complacency in their own achievement, or through an inability to realise that methods and ideas quite unknown to them can be of value, assert that no further technical advance in surgery can take place. The statement has been made at intervals and always it has been falsified, and I have tried hard myself to avoid giving any such impression. Perhaps I have conveyed the idea that the field of surgery will always grow narrower, but that is because I lack the imagination to be able to foretell what additions to the surgeon's repertory will be made. It is undeniable that subtractions are continually occurring and yet surgical activity increases rather than diminishes. Probably this is due to increased facilities for surgery, better diagnosis, and the better education of the people in surgical matters. It is, I think, certain that contraction will eventually occur, as preventable disease is eliminated and as earlier diagnosis renders surgery less and less necessary. The enthusiastic surgeon may console himself with the thought that congenital defects (in spite of eugenics) and accidents will always remain, whatever else may be taken from him. There may, alas, even be another war to which he will look to provide fresh impetus for the development of his craft, when the force of the Great War has expended itself. But even there lurks disappointment, for the next war may not be so much a war of wounds as the last one. Death will be dealt out in more insidious ways, and surgery may not be called upon to perform so many of her wonders. Destruction will be more complete, and will be carried far beyond the front line of the combatants, so that most of the surgeons may be themselves dead or out of action. Machaon will look less god-like in a gas-mask, and he will carry in his hand a hypodermic syringe and ampoules of antibacterial serum rather than a scalpel.

Surgery as a Science

You may have perceived that I have spoken through most of this address of surgery as the term is generally understood, that is, as a handicraft; but I have protested against the attitude of surgeons who choose to stand aloof from science and so tend to tie their profession down to the status of refined carpentry. I feel sure, however, that I have given to surgery a narrower sense than it will come to hold in the future, and than it already does hold wherever surgery is most alive, for as time passes it will draw nearer to the status of an applied science. To achieve this the surgeon will coöperate more and more closely with medicine and with biological and biochemical science. Examples of this tendency can be seen to-day in many fields of surgery, such as the thyroid gland and other endocrine glands, the central nervous system, the sympathetic nervous system, the urinary system, and so on. We have heard a great deal in recent years of the value of team-work, and this has not been entirely lip-service to an ideal. The pure scientist may at any moment stumble on facts related to surgery, and if these teams exist, surgery may receive unexpected advancement. Only the other day I was shown at the Cancer Hospital a series of mice which had been the subject of experiment in connexion with the genesis of cancer. Who could have foretold that œstrin, a crystalline hormone extracted from the urine of mares, would, when painted on the skin of a male mouse, produce enlargement of the prostate and the development of large inguinal hernias? Yet such is the extraordinary fact, and, irrelevant as it may seem, it may lead in directions of importance to surgery. It is impossible to foretell exactly how this balance between surgery and the allied sciences is to be achieved, but at least it must not be said that the surgeon has remained indifferent to any discovery, of whatever nature, that might lead to the advancement of his craft. The trend of events shows that the surgical mind can possess the qualities of sympathy and collaboration, and whatever the future may hold it is safe to assert that never was surgery in general more living than it is at the present moment. We may be forgiven if we believe that this is the golden age of surgery, for, after all, it is the present, not the past or the future, in which we live.

THE HORMONES AND THEIR CHEMICAL RELATIONS *

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LECTURE III

The application of the study of organic chemistry to the internal secretions of the thyroid itself has proved so successful that the hormone has now been synthesised. Since, however, this work is well known, it will only be necessary to give a few of the more important landmarks.

Discovery of Thyroxine

It will be remembered that the thyroid gland was the first organ to which could be attributed an internal secretion. The classical writings of Sir William Gull in 1874 described the condition of myxœdema in great detail and laid great emphasis on the thyroid atrophy. Three years later Ord (1878) confirmed these observations and suggested the name—myxœdema. In 1895 Kocher demonstrated the relationship between natural myxœdema and that following thyroidectomy. It was also shown that post-operative myxœdema responded to treatment by the administration of thyroid gland.

The next important stage was the discovery of iodine as a constituent of the thyroid gland. It was put forward as a suggestion by Kocher in 1895 that normal thyroid gland might possibly contain iodine, since he had shown that iodine had a profound influence upon the morphology and activity of the organ. Tschirch (Kocher, 1895) attempted the search for this element, but entirely failed. The proof that the thyroid contained iodine was given by Baumann (1895), who continued his work until he isolated a protein which he termed iodothyrine. This substance contained iodine and possessed distinct physiological activity as studied upon thyroidectomised animals and myxœdematous human beings. Quantitative studies showed that the compound was more active weight for weight than thyroid gland, and that the iodine content was considerably increased.

From this time onwards a series of very elaborate

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* The Goulstonian lectures for 1934, delivered before the Royal College of Physicians of London on March 6th, 8th, and 13th. Lectures I. and II. appeared in our last two issues.

chemical experiments were performed and various protein-like concentrates were obtained which were claimed to represent the actual internal secretion of the thyroid in a pure state. It will not be profitable to review all this work, but to jump to the year 1915 when the publication of Kendall's well-known experiments resulting in the discovery of the true internal secretion of the thyroid appeared (Kendall, 1915). The process resulting in the separation of this compound was extremely complicated and the yields very poor. The essential part of the manufacture consisted in a hydrolysis of the gland with barium hydroxide solution. So poor was the yield, that starting with over a ton of thyroid he obtained relatively few milligrammes of the active body. The formula $C_{11}H_{10}O_3NI_3$ was allotted to the compound in view of its percentage composition. Kendall maintained that the compound was an iodine derivative of an indol compound, but that has since been disproved and it will be unnecessary to consider it.

The crystalline compound isolated by Kendall was very soon found to be the most potent substance for raising the basal metabolic rate of any hitherto described, and it was only natural that severe competition ensued between clinicians and organic chemists for the few milligrammes of this body that were available. Until an adequate method for the preparation of thyroxine in large quantities could be obtained, no progress of any sort could be expected.

The next advance was made by Harington (1926) who, in 1926, described a new method for the isolation of thyroxine from the thyroid gland and one which gave a very much better yield, thus enabling a detailed study of the constitution of this interesting substance to be made. A long series of experiments proved that Kendall's ideas as to the constitution were incorrect, and that thyroxine was a derivative, not of tryptophane, but of tyrosine. Harington was able definitely to establish the constitution and to prove that thyroxine has the formula seen in Fig. 16. Still later, with Barger, he was able to synthesise the substance (Harington and Barger, 1927).

When injected subcutaneously or intravenously in minute doses, thyroxine is capable of raising the basal metabolic rate of experimental animals and of human beings. It will also completely relieve the symptoms of myxœdema. Its activity, however, when given by mouth is very slight owing to its great insolubility, and one must conclude that very little is absorbed.

Substitutes for Thyroxine

In view of our interest in synthetic substances it is necessary to consider certain other iodine-containing compounds present in the thyroid gland. One of these is di-iodo-tyrosine (Fig. 17). This compound appears to be completely inactive when administered in a similar manner to thyroxine. In so far as is known this substance is not a normal constituent of food, and therefore must be synthesised in the body—possibly in the thyroid. Harington suggests that it may represent a stage in the synthesis of thyroxine.

Another interesting compound is a derivative of thyroxine—namely, 3 : 5-di-iodo-thyronine (Fig. 18). This compound does not appear naturally in the thyroid in so far as is known, but can be made relatively easily in the laboratory. Gaddum (1927–28 and 1929–30) has observed that this compound possesses definite activity of the same type as is displayed by thyroxine. He found that the activity, as measured by acceleration of metamorphosis of tadpoles, was about *one-fifteenth* the activity of thyroxine ; whilst the effect of oxygen consumption of rats was about one-fortieth of that of thyroxine. In a recent paper by Anderson, Harington, and Murray Lyon (1933) clinical experiments with this compound were described. The desirability of using it is indicated by its relatively much greater solubility in water than thyroxine, and hence the possibility of its activity when given by the oral route. They were able to show that this compound when administered in doses of 50 to 75 mg. daily was capable of relieving all the symptoms of severe and well-established myxœdema. In all cases the basal metabolic rate was restored to normal and the characteristic myxœdematous appearance vanished. They justly concluded that this compound could replace thyroxine in every way, and that since it is readily obtainable by synthesis in a pure state, there is every reason to hope that eventually its use will entirely replace that of thyroid extract which, even at the best of times, is only capable of extremely rough standardisation. These workers do not discuss in any detail the reason for the similarity of activity between thyroxine and 3 : 5-di-iodo-thyronine. They suggest that perhaps this compound is transformed in the body into thyroxine itself. The interest from our point of view however lies in the fact that they have shown that the thyroid lock may be picked by a skeleton key. If we contrast the two formulæ it can be seen that they are relatively near to each other in structure, and all that is required is the introduction of two iodine atoms into the 3′ : 5′ position. However, the phenomenon is precisely the same as in the œstrin substitutes, but in the latter case the similarity between the natural substance and the skeleton key is by no means so close.

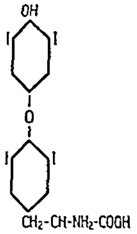

FIG. 16
Thyroxine.

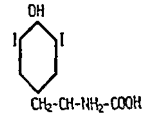

FIG. 17
Di-iodo-tyrosine.

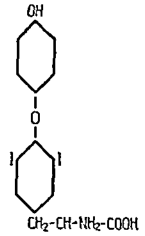

FIG. 18
3 : 5-di-iodo-thyronine.

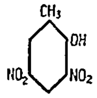

FIG. 19
4 : 6-dinitro-o-cresol.

It will be remembered that in discussing the significance of the activity of the œstrin substitutes the idea that they were converted in the body into œstrin did not appear to be justifiable, particularly when one bears in mind that this conversion, if it occurs at all, would occur in the body of the ovariectomised animal. If any organ were to be responsible for this conversion, one would have thought that the ovary was the most likely. In the same way one would also have thought that the thyroid gland would have been the seat of the conversion of 3 : 5-di-iodo-thyronine into thyroxine. Since, however, this compound is active in cases of myxœdema with presumably little or no functioning thyroid, it would appear that the same arguments apply in this problem as in the substitutes for œstrin.

Where do Hormones Act ?

Hitherto we have considered only the actions of these hormones and their substitutes upon surviving animals, and in order to introduce the next type of synthetic substance it will be necessary for a brief period to consider the actual site of action of these hormones. If we take one of the apparently simpler examples—namely, the action of insulin—it appears at first sight that insulin reduces the blood-sugar by increasing the oxidation of this substance in the body. This theory was held as a theoretical conception before insulin was isolated, and it was therefore with great surprise that no action of the then new hormone insulin could be demonstrated on either glucose solutions or on isolated tissues.

It is well known that thanks to the methods of Warburg (1926 and 1928) it is possible to work out the metabolism of slices of surviving tissue using some 10 mg. or so, and by the adoption of manometric methods the oxidative process of the tissue may be investigated. Very roughly it may be stated that this includes the breakdown of carbohydrate by two entirely distinct methods. The first is by a process known as respiration in which the glucose is burned to carbon dioxide and water; this we know to be controlled by an organo-metallic catalysis process of which the metal is iron and the catalyst most probably a hæmatin derivative. The second process is one known as glycolysis in which the carbohydrate is converted to lactic acid; this may occur both aerobically and anaerobically. These two systems are quite separate but bear a certain quantitative relationship to one another.

If we take a tissue slice and add insulin to it, and measure the metabolism continuously by the methods of Warburg, it is not possible to demonstrate any change whatsoever. It is also very strange to recount experiments with thyroxine. The addition of thyroxine to such a tissue slice will not produce any increase in either respiration or glycolysis, no matter how much thyroxine be added. We are here faced with a very complex problem in that insulin and thyroxine when injected into intact animals will produce profound modification of the carbohydrate metabolism and total metabolism respectively, and yet are completely without activity on the isolated tissue slice. It is indeed unfortunate that no explanation can as yet be advanced to explain this difficulty. There are of course a few examples of hormones that will act upon the isolated organs, for example oxytocin and adrenaline, yet it must be remembered that a surviving uterus possesses an elaborate arrangement of sympathetic nerves, whilst a spiral cut from an artery which can be made to contract by adrenaline also possesses a highly organised structure. Yet it can readily be proved that the respiration and metabolism of these tissue slices in the Warburg manometric apparatus are capable of responding to various chemical agents. For example, the addition of methylene-blue will cause a marked increase in respiration, and the same may be said of other compounds such as the naturally occurring pyocyanine and also the synthetic pyocyanine.

Action of the Nitrophenols

I propose to discuss a compound which possesses the unique quality of acting, not only on the body as a whole, but also on the tissue slice. This compound, 4 : 6-dinitro-o-cresol, possesses the formula shown in Fig. 19 and belongs to the group of polynitrophenols.

It has been known since the year 1885 that certain nitrophenols possessed a marked influence on metabolism; this was shown first by Cazeneuve and Lépine (1885). They were able to show that certain nitrophenols were toxic, and when injected in small and repeated doses death occurred with hyperpyrexia.

Little attention appears to have been paid to this important problem until the year 1928, when a series of experiments were commenced in Heymans's laboratory in Ghent (Heymans and Bouckaert, 1929; van Uytvanck, 1931; Moraes and Casier, 1933). Heymans and his collaborators were able to show that 2 : 4-dinitro-phenol was capable of causing death from hyperpyrexia in pigeons and dogs when administered in small doses at daily intervals, and that before the rise in temperature there was a very marked rise in the oxygen consumption.

In 1932 Plantefol and his collaborators published an extensive work on the pharmacological activity of 2 : 4-dinitro-phenol (Plantefol et al, 1932). In this important publication will be found the full pharmacological details of the action of 2 : 4-dinitro-phenol. They were able to show that the compound raises the basal metabolic rate in all animals whether injected subcutaneously or given by mouth. They also proved that the compound increased the respiration of yeast cells. In the final paper in this monograph they demonstrated the fact that only those nitrophenols which possessed two nitro groups in a position corresponding to the 2′ : 4′ were active. Other dinitro- or polynitro-phenols appeared to have the reverse effect.

Last year Cutting, Mehrtens, and Tainter (1933) published an account of the uses of dinitrophenol for the purpose of stimulating human metabolism, particularly with a view to producing a reduction in weight. They repeated the earlier experiments of Heymans, Plantefol, and others, and they were able to confirm that the administration of the compound to animals resulted in an immediate rise in basal metabolic rate. When daily doses of 3 to 5 mg. per kg. of body-weight were given to patients the basal metabolic rate rose rapidly to about +40 per cent. and remained at this level for as long as it was administered. As soon as the drug was withheld the basal metabolic rate fell to normal. They were interested solely in the treatment of obesity and their conclusions are that the compound is quite safe to use for a reduction in weight.

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A typical example of the increase in oxygen consumption is shown in the following experiment. The basal oxygen consumption of the guinea-pig in question was found by the method already referred to, to equal 0·0135 c.cm. oxygen per gramme of guinea-pig per minute; the temperature of the animal at this stage was 97° F. Eight milligrammes of dinitro-o-cresol were dissolved in sesame oil and this was administered by subcutaneous injection. One hour afterwards the oxygen consumption had risen to 0·0376 c.cm. per minute and the temperature had increased to 100·9° F. Four hours later the temperature had reached 102·8° F., whilst the oxygen consumption had increased to 0·0460 c.cm. per gramme of guinea-pig per minute. The exactly similar experiment with 2 : 4-dinitro-phenol produced a rise of about one-fourth of the magnitude.

CLINICAL EXPERIMENTS

We concluded that dinitro-o-cresol was a much more suitable substance than dinitrophenol for clinical experimentation, since weight for weight it is many times more potent, and appeared to be of about the same order of toxicity. Together with Robertson (Dodds and Robertson, 1933[1]) I therefore proceeded to investigate the effects of this compound upon normal human beings.

The first series of experiments here outlined were those in which 3 mg. per kg. of body-weight were given. This caused alarming increases in the basal metabolic rate, from a normal of −5 to +70 in five days in one case, and from −10 to +100 in another. On withdrawing the drug the metabolic rate fell rapidly and within four days after the administration was discontinued the basal metabolic rate was down to normal.

A series of very interesting toxic phenomena were found when the basal metabolic rate rose above +50. The patients were uniformly restless and uncomfortable and suffered from severe attacks of sweating. Strange to say they were drowsy during the day and restless at night, the disturbed nights being mainly due to the great increase of sweat. Some patients suffered from severe headache, and all showed a slight lemon yellow pigmentation of the sclerotics and the skin. A very careful investigation of the blood and urine was performed when this pigmentation was at its height, but no evidence of excess of bile-pigments or their derivatives could be discovered in either blood or urine. The temperature was only slightly increased even when the basal metabolic rate was increased to +100. The patients also suffered from loss of appetite and felt very depressed and miserable.

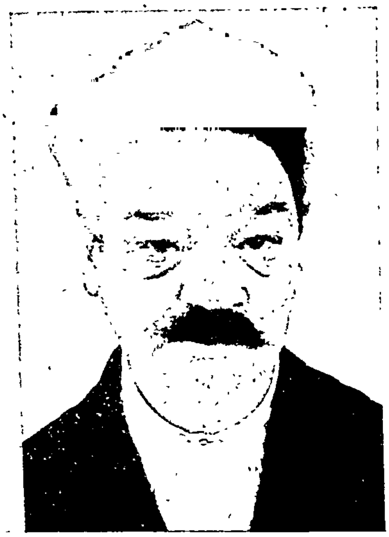

FIG. 20.—B.M.R. raised to + 20 by dinitro-o-cresol. Myxœdema unrelieved.

One of the most striking points about this elevation of the basal metabolic rate was that it was unaccompanied by a corresponding increase of pulse-rate or those changes which have been described by Read (1922) occurring in hyperthyroidism. This was the first indication to us that the action differed very considerably from that of thyroxine. We were able to obtain another striking demonstration of the difference between the action of thyroxine and dinitro-o-cresol, since we were able to observe its effect on a case of myxœdema (Dodds and Robertson, 1933 [2]).

The subject was a man, aged 42, who had had well-marked myxœdema and had been attending hospital for some three years. It had been found necessary to administer 2 grains of thyroid (B.P., 1932) daily in order to maintain the basal metabolic rate within normal limits and to keep him free from symptoms and signs of myxœdema. The administration of thyroid extract was stopped and the symptoms of myxœdema were allowed to develop. At this stage the basal metabolic rate as determined by the Benedict-Roth apparatus was −18. In the first place he was given daily doses of dinitro-o-cresol at the rate of 3 mg. per kg. of body-weight—that is to say the same amount that produced a rise of roughly +100 per cent. in three or four days in normal persons. The basal metabolic rate rose sharply from −18 to +73 per cent. and again the same toxic symptoms were observed—namely, lethargy during the day and intense perspiration during the night, loss of appetite, and general discomfort. The drug was discontinued and the basal metabolic rate fell rapidly to −18.

This observation proves conclusively that the myxœdematous person, with presumably no functioning thyroid tissue, responds as well to the action of this drug as does the normal person. In the second series of observations, sufficient quantity of the drug was administered daily to keep the basal metabolic rate well above normal, and it was found that in this case 100 to 150 mg. per day administered by mouth enabled him to maintain the basal metabolic rate at +20. Although his basal metabolic rate varied between +20 and +30 per cent., his myxœdema was unaffected as can be seen by the picture (Fig. 20), which shows the stigmata of the disease very clearly.

We have here, therefore, a very interesting spectacle of a myxœdematous patient with a basal metabolic rate of between +20 and +30, thus indicating that thyroxine does not relieve the symptoms and signs of myxœdema by merely raising the basal metabolic rate. The drug was then withdrawn and the basal metabolic rate fell to −18; thyroid was then administered until the basal metabolic rate was maintained at between 0 and +10 per cent. The symptoms of myxœdema disappeared in a very short time, and the next picture (Fig. 21) shows the patient again with a basal metabolic rate of +10 with all his symptoms of myxœdema cleared up. It is important to bear in mind that the first photograph, showing the symptoms and signs of myxœdema obviously present, was taken when his basal metabolic rate was +20 to +30 per cent.

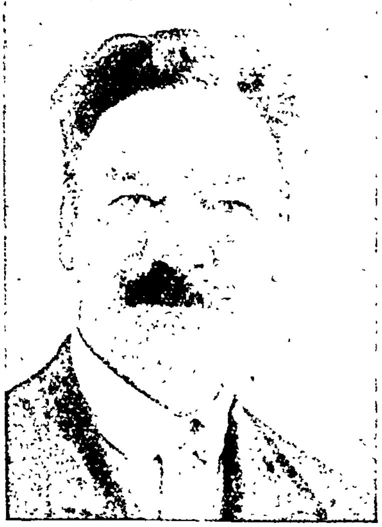

FIG. 21.—B.M.R. raised to + 10 by thyroid. Myxœdema completely relieved.

These experiments prove conclusively that we are here dealing with an entirely different mechanism and that a depression in basal metabolic rate bears no relation to myxœdema, nor, alternatively, will an artificially raised basal metabolic rate clear up the symptoms, and that therefore thyroxine must act in a manner quite apart from its mere stimulation of metabolism.

RESPIRATION OF ISOLATED TISSUES

There is one final difference between the action of dinitro-o-cresol and thyroxine that I have to bring to your notice. It will be remembered that I have already called attention to the fact that naturally occurring hormones will not act upon isolated tissues, and that however much thyroxine be added to a surviving slice of tissue, it is impossible to demonstrate any increase in the oxidation by the method of Warburg. In my laboratory Greville and I (Dodds and Greville, 1933) have been able to show that the reverse obtains with dinitro-o-cresol. The measurements were made in the Haldane-Barcroft-Warburg period to consider the actual site of action of these hormones. If we take one of the apparently simpler examples—namely, the action of insulin—it appears at first sight that insulin reduces the blood-sugar by increasing the oxidation of this substance in the body. This theory was held as a theoretical conception before insulin was isolated, and it was therefore with great surprise that no action of the then new hormone insulin could be demonstrated on either glucose solutions or on isolated tissues.

It is well known that thanks to the methods of Warburg (1926 and 1928) it is possible to work out the metabolism of slices of surviving tissue using some 10 mg. or so, and by the adoption of manometric methods the oxidative process of the tissue may be investigated. Very roughly it may be stated that this includes the breakdown of carbohydrate by two entirely distinct methods. The first is by a process known as respiration in which the glucose is burned to carbon dioxide and water; this we know to be controlled by an organo-metallic catalysis process of which the metal is iron and the catalyst most probably a hæmatin derivative. The second process is one known as glycolysis in which the carbohydrate is converted to lactic acid; this may occur both aerobically and anaerobically. These two systems are quite separate but bear a certain quantitative relationship to one another.

If we take a tissue slice and add insulin to it, and measure the metabolism continuously by the methods of Warburg, it is not possible to demonstrate any change whatsoever. It is also very strange to recount experiments with thyroxine. The addition of thyroxine to such a tissue slice will not produce any increase in either respiration or glycolysis, no matter how much thyroxine be added. We are here faced with a very complex problem in that insulin and thyroxine when injected into intact animals will produce profound modification of the carbohydrate metabolism and total metabolism respectively, and yet are completely without activity on the isolated tissue slice. It is indeed unfortunate that no explanation can as yet be advanced to explain this difficulty. There are of course a few examples of hormones that will act upon the isolated organs, for example oxytocin and adrenaline, yet it must be remembered that a surviving uterus possesses an elaborate arrangement of sympathetic nerves, whilst a spiral cut from an artery which can be made to contract by adrenaline also possesses a highly organised structure. Yet it can readily be proved that the respiration and metabolism of these tissue slices in the Warburg manometric apparatus are capable of responding to various chemical agents. For example, the addition of methylene-blue will cause a marked increase in respiration, and the same may be said of other compounds such as the naturally occurring pyocyanine and also the synthetic pyocyanine.

Action of the Nitrophenols

I propose to discuss a compound which possesses the unique quality of acting, not only on the body as a whole, but also on the tissue slice. This compound, 4 : 6-dinitro-o-cresol, possesses the formula shown in Fig. 19 and belongs to the group of polynitrophenols.

It has been known since the year 1885 that certain nitrophenols possessed a marked influence on metabolism; this was shown first by Cazeneuve and Lépine (1885). They were able to show that certain nitrophenols were toxic, and when injected in small and repeated doses death occurred with hyperpyrexia.

Little attention appears to have been paid to this important problem until the year 1928, when a series of experiments were commenced in Heymans's laboratory in Ghent (Heymans and Bouckaert, 1929; van Uytvanck, 1931; Moraes and Casier, 1933). Heymans and his collaborators were able to show that 2 : 4-dinitro-phenol was capable of causing death from hyperpyrexia in pigeons and dogs when administered in small doses at daily intervals, and that before the rise in temperature there was a very marked rise in the oxygen consumption.

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as 3 : 5-di-iodo-thyronine and the various phenanthrene and di-benzanthracene derivatives, it is incapable of replacing the activity of the natural substance. These latter require either the intact animal, or at least part of the intact animal, and therefore must act in an entirely different manner. It is hoped that these observations will concentrate the attention of workers on the fundamental problem of the action of hormones.

To many it would appear that the isolation of the hormone represents the be-all and end-all of the experimentalist's aim and object. Yet we know that unless the actual mechanism of action is understood, we only understand one fraction of the problem. Until we can find out where the hormones act and explain why dinitro-o-cresol will act upon an isolated tissue slice whilst thyroxine is without action, we cannot claim to have progressed very far in the study of these phenomena.

The Mechanism of Simmonds's Disease

Let us now return to our starting-point—namely, Simmonds's disease. Here we see that a destruction of the anterior lobe of the pituitary causes degeneration of the thyroid, the ovaries and testes, the pancreas, the suprarenal, and possibly the parathyroids. We have only studied in any detail the gonadotropic hormone (prolan) and the thyrotropic hormone, and we have seen that these hormones of unknown constitution and protein character cause the organs mentioned above to produce substances that are capable of being attacked by the organic chemist.

I cannot here consider in any detail the adrenotropic hormone which has been described by Collip, Anderson, and Thomson (1933). They showed that in hypophysectomised animals definite changes in the suprarenal gland could be seen and these could be prevented by the administration of extract of anterior lobe.

Anselmino, Hoffmann, and Herold (1934) have confirmed this work, and they have also been able to demonstrate similar alterations in the pancreas and in the parathyroid glands of hypophysectomised animals, and that these changes could be prevented by the administration of a suitable extract (Anselmino, Herold, and Hoffmann, 1933,[1 2]; Anselmino and Hoffmann, 1933).

We are now in a position to understand the mechanism of Simmonds's disease. Perhaps the accompanying diagram will go some way towards clearing up and sorting out this elaborate tangle of hormones (Fig. 22). We can see in it hormones acting upon the thyroid, gonads, suprarenal, pancreas, and parathyroid. Remember that these hormones are of the protein character and at present of unknown constitution, and it must be admitted that even the great advances in the study of organic chemistry are not yet adequate to deal, either from the analytical or the synthetic point of view, with these compounds. The respective organs mentioned above, when activated by the anterior lobe, produce their respective hormones which, with the exception of the pancreas, are clear-cut chemical entities which have yielded their secrets of constitution to the art of the organic chemist; their structure is also shown on this diagram.

Together with these formulæ appear the graphic formulæ of a series of skeleton keys which are capable of opening the lock equally well, and at one side of thyroxine and 3 : 5-di-iodo-thyronine, under adrenaline, will be found two skeleton keys—namely, ephedrine and tyramine, both of which appear to act in the same way as adrenaline.

The final column running transversely across the diagram has been labelled Pass Keys. In this group of compounds are found substances which will open more than one biological lock. Under the sex hormones we find the two carcinogenic hydrocarbons, 1 : 2-benzpyrene and 5 : 6-cyclopenteno-1 : 2-benzanthracene which, in addition to causing malignant disease when applied to the skin, are also capable of producing œstrus; here we also find calciferol or vitamin D which can protect against rickets and at the same time will produce œstrus if given in sufficient quantities. Included in this category is 4 : 6-dinitro-o-cresol under the heading of the thyroid secretion. This will perform part of the functions of the thyroid hormone, yet will not protect against myxœdema; on the other hand it will stimulate the metabolism of the tissue slice.

In general it would appear that the anterior lobe of the pituitary produces hormones of extreme complexity belonging to the protein class which act upon organs such as the thyroid, suprarenal, testes, and ovaries, which in turn produce hormones which have yielded their secrets to the organic chemists. These in turn may be imitated by similar compounds manufactured entirely in the laboratory without any connexion with any biological material. There still remains a very large section of the chart to fill in.

Conclusion

The first Goulstonian lecture was delivered in the year 1639, but to a biochemist the lectures for the year 1831 are amongst the most interesting. Exactly 103 years ago, at about this time of the year and in the same theatre, Dr. William Prout delivered three Goulstonian lectures before Sir Henry Halford, the then president, and the censors. It is safe to say that Dr. Prout was one of the first physicians to realise the importance of chemical knowledge in relation to medicine. In the first place he possessed an excellent knowledge of the advanced organic chemistry of the day, and was the first to apply this knowledge in detail to problems of animal and human metabolism. There can be little doubt that Dr. Prout's writings formed one of the major stimuli to Liebig.

It would take too long even to summarise the important researches of this distinguished Fellow of the College. Intimately concerned as he was in the controversy concerning Dalton's theory, he found time to establish beyond all doubt and in the face of the bitter opposition of Claude Bernard, the identity of hydrochloric acid as a normal constituent of the gastric juice. It is interesting to note the tone of his lectures. To the present-day reader, accustomed to the highly technical scientific papers, the writings of the period we are discussing are very involved, and the meanings are frequently wrapped up in elaborate phraseology. This philosophical method of approach to medical and scientific problems was, however, the order of the day. It must be remembered also that the great science of organic chemistry had only just been founded, and it was all but impossible to believe that the organic chemist would solve the composition of the most complex compounds in nature. Bearing this in mind, we can well understand the warning that Prout gives to his audience in the first Goulstonian lecture. He warns them against expecting too much from the chemist, and he remarks that "he (the chemist) will soon discover, for example, that nature will not permit him to officiate as her journeyman, even in the most trifling degree" (Prout, 1831). I trust that the evidence I have brought forward will convince you that even so discerning a prophet as Dr. William Prout took too gloomy a view of the future of chemistry as applied to medicine.

I record with pleasure my indebtedness to those who have kindly read through the manuscript of these lectures and have suggested improvements and corrections: Mr. J. W. Cook, D.Sc., Prof. E. L. Kennaway, F.R.S., Mr. W. Lawson, and Dr. J. D. Robertson. To Miss M. I. Powell I owe a very great debt for her care and trouble in the preparation of these lectures.

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LEICESTER ROYAL INFIRMARY.—The annual report of this hospital fills an octavo volume of 360 pages. In 1933 admissions numbered 7069; the children's hospital received 1319 patients. There were 13,250 new out-patients and 20,592 casualties. Traffic accident cases numbered 1313, all but 40 of which were motor casualties. Of this total 296 cases were admitted; they spent 6557 days in hospital and cost £2850. For the third time in the last 16 years income met expenditure; the total income of £86,452 provided a credit balance of £30. The infirmary now possesses nearly half a gramme of radium element, which cost £6922. The Leicester and County Saturday Hospital Society is equipping Overstrand Hall, Cromer, as a home for female patients, and it will be opened at Whitsuntide. The erection of a home for men in the grounds will then be begun. Consequential changes will eventually liberate 50 beds for women and 60 for men.

THE CLINICAL INVESTIGATION OF STAPHYLOCOCCAL TOXIN, TOXOID, AND ANTITOXIN

By H. J. PARISH, M.D., M.R.C.P. Edin.
R. A. Q. O'MEARA, M.D. Dub., F.R.C.P. Irel.
AND
WINIFRED H. M. CLARK, B.Sc. Edin.

(From the Wellcome Physiological Research Laboratories, Beckenham, Kent)

THERE is a wide difference of opinion concerning the use of such measures as vaccine therapy, chemotherapy, and the administration of yeasts in the prophylaxis and treatment of boils and other staphylococcal diseases (vide Hallam, 1932); in general the results have been disappointing, and some other adjunct to surgery is clearly called for. Recently investigations have been made of the rôle of circulating antitoxin in affording protection against natural and experimentally induced infection, and concentrated antitoxic sera have become available for therapeutic purposes. Staphylococcal toxoid has also come into clinical use experimentally. The purpose of this paper is to describe a few experiments we have carried out with staphylococcal toxin, toxoid, and antitoxin, and, by correlating this work with observations which have been made in Australia, Canada, and Germany, to draw attention to some of the *immunological problems which still await* elucidation, more especially on the clinical side. Hitherto comparatively little has been done by pathologists in this country.

STAPHYLOCOCCAL TOXINS: PREPARATION AND POTENCY

Toxins have been prepared from a number of strains on Burnet's 0·8 per cent. agar medium to which Parker's 2 per cent. buffered broth (modified) has been added after 48 hours' growth (Parish and Clark, 1932). For assessing the value of our experimental toxins we have used skin neutralisation tests in the guinea-pig, and hæmolytic *titrations using* rabbit corpuscles, the potency in each case being *expressed in terms of the amount of a laboratory* standard serum "K," which has completely neutralised 1·0 c.cm. of toxin. Technical details of the hæmolytic test are discussed later in this paper.

Lightly coloured variants of *Staphylococcus aureus*, Wood 46, which was isolated in Australia from a case of extensive infected burns, have consistently produced good toxin in our hands; 1·0 c.cm. of each of eight successive batches of toxin has required for its neutralisation between 0·04 and 0·13 c.cm. of standard serum K, both in vivo and in vitro. These strains have been largely used for the preparation of toxin and toxoid for immunisation. Lightly coloured variants of other *aureus* strains have *also produced* better toxins than the parent cultures. For example, 1·0 c.cm. of toxin, *prepared from* a *culture* isolated in Sweden from an infected arm associated with vaccination, was equivalent to 0·003 c.cm. of serum K by guinea-pig intracutaneous test and 0·0025 c.cm. by hæmolytic test, whereas 1·0 c.cm. of toxin from a lightly coloured variant of this culture neutralised 0·01 c.cm. of serum K by both tests. In our series there has been no relationship between the potency of the toxin prepared by our method and the clinical severity of the condition from which the strain has been isolated; we have failed completely to prepare good toxin even from the Bundaberg strain which was responsible for the deaths of 12 children from staphylococcal septicæmia in 1928. A similar observation has of course been made in diphtheria, for it is well known by immunologists that strains of *Corynebacterium diphtheriæ* isolated from clinically severe and fatal cases are often of low toxigenicity under the conditions in which potent toxins are usually prepared in the laboratory.

The guinea-pigs "intradermic value," and the hæmolytic value using rabbit corpuscles as determined by combining power, have always approximated to one another, irrespective of the potency of the toxins. Titrations with sheep corpuscles have, however, sometimes given entirely different readings. Neisser and Wechsberg (1901), Bigger, Boland, and O'Meara (1927), and Gross (1932), amongst others, have commented on the differences in hæmolytic titre obtained with the blood of different animals, and Glenny (unpublished) is at present engaged in a special study of the different toxic constituents concerned and their corresponding antibodies. At this stage of the investigation the worker in the clinical laboratory, who is limited in the scope of his inquiry and in the numbers of toxins and sera at his disposal, should confine himself solely to titrations with rabbit cells. He will then have much less difficulty in deciding upon the end-point, and will not be handicapped, as in titration with sheep cells, by having to pay attention to the phenomenon of "hot-cold" lysis (Bigger, Boland, and O'Meara, 1927; Bigger, 1933).

PREPARATION OF STAPHYLOCOCCAL TOXOID

The toxoid has been prepared by adding 0·5 per cent. of formalin to the culture filtrates and incubating for 3 to 14 days at 37° C. to detoxicate. As a preliminary to investigating the antigenicity of the toxoid in laboratory animals or man, tests have always been carried out to ensure absence of toxicity and retention of combining power.

TITRATION OF STAPHYLOCOCCAL ANTITOXIN (ANTIHÆMOLYSIN)

We have already indicated that the antihæmolytic titre, when rabbit corpuscles are used, is a useful measure of antitoxic content. Since the titration of the antihæmolysin present in a patient's serum may furnish valuable information of his response to active immunisation with toxoid or passive with antitoxin, we give our technique in some detail.*

The reagents required include (*a*) our "standard" staphylococcal toxin, B.8750, (*b*) our "standard" staphylococcal antitoxin K, (*c*) rabbit red blood corpuscles (R.B.C.), thrice washed in normal saline, and re-suspended in saline—2 per cent. of "packed" R.B.C.—made up fresh each day, (*d*) the patients' sera, and (*e*) normal saline. It is sufficiently accurate to use dilutions of toxin and serum, prepared on a 50 per cent. difference scale. Two pipettes should be specially marked and set aside for use only with (*a*) undiluted standard toxin, and (*b*) undiluted standard serum respectively. They should on no account be used for any purpose other than measuring undiluted standard toxin and serum. It is advisable to use a separate pipette for each patient's serum, and all pipettes should be thoroughly washed out after use.

The minimum hæmolytic dose (M.H.D.) of standard toxin B.8750 has been determined by mixing in a series of tubes (*a*) a series of toxin dilutions showing 50 per cent. differences, 0·5 c.cm. to each tube, (*b*) 0·5 c.cm. saline, and (*c*) 1·0 c.cm. of 2 per cent. washed rabbit R.B.C. Readings have been made after 1 hour at 37° C., the end-point being the last tube to show complete hæmolysis; from this, the M.H.D. of the toxin can readily be calculated. Since the R.B.C. of different rabbits show individual variation in their resistance to hæmolysis, it has been customary to take the average end-point of a number of titrations as the true M.H.D. of standard toxin B.8750. On this basis, 2 M.H.D. of this toxin are contained in 0·5 c.cm. of a dilution of 1 in 20. When this dilution is used, the end-points of the antihæmolytic titres of sera undergoing test remain constant from day to day. The explanation is that, in titrations involving the neutralisation of toxin by antitoxin, R.B.C. added to the mixtures act solely as an indicator to detect the presence of uncombined toxin.

The method of setting up the titrations of the antihæmolytic power of sera is as follows: In each row of tubes are mixed together (*a*) a series of serum dilutions showing 50 per cent. differences, 0·5 c.cm. to each tube, and (*b*) 0·5 c.cm. of toxin B.8750, diluted 1 in 20. Five minutes later 1·0 c.cm. of 2 per cent. washed rabbit R.B.C. is added, and the contents of the tubes are again thoroughly mixed. After 1 hour at 37° C. the tubes are once more inverted to mix the contents, and then removed from the water-bath. The unhæmolysed R.B.C. are given an opportunity to settle, and the results are then read—usually after one to two hours. If desired, readings may be made after standing overnight, when the end-point will be the same as when readings are taken after a shorter interval (this is only of general application when rabbit R.B.C. are used in the titration). The end-point we have taken is the last tube to show complete absence of hæmolysis—i.e., complete neutralisation of the toxin.

In every series of tests of this type it is important to include a "standard" antitoxin as control. Our "standard" serum is conveniently represented by the symbol K, indicating that it is a constant. Since it is considerably more potent than samples of human serum, it is diluted 1 in 100 as a preliminary to titration on a 50 per cent. difference scale. The results of titrations of patients' sera are expressed as decimal fractions of serum K, never in terms of a variable such as M.H.D. of toxin. The outstanding advantage of this method of expressing the results is that, as soon as an official standard serum is adopted, the potency of sera titrated by this technique will be capable of being expressed in terms of the official standard.

CIRCULATING ANTITOXIN IN "NORMAL" ANIMALS AND MAN

Since Neisser and Wechsberg (1901) first demonstrated the presence of natural antibody in the sera of "normal" laboratory animals and human subjects, a number of workers have made confirmatory observations. The results of our titrations, using as the test toxin our standard toxin B.8750, are given in Table I.

TABLE I

Circulating antitoxin (antihæmolysin)—"normal" sera

—	Sera examined.	Antitoxin as decimal fractions of "standard" serum K.						
		0–0·003	0·007	0·01	0·02	0·03	0·05	0·07
Rabbit ..	100	88	2	7	1	2	0	0
Guinea-pig .	50	41	0	2	2	5	0	0
Horse ..	50	1	7	11	5	18	6	2
Human ..	100	31	34	30	4	1	0	0

This shows a wide variation in the antihæmolytic titre of different animals and men. A similar observation has been made by Bryce and Burnet (1932), who have also shown that about 50 per cent. of 61 normal rat sera which they examined contained demonstrable antitoxin. That so many animals of different species have appreciable amounts is not surprising in view of the widespread distribution of the staphylococcus.

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* A memorandum giving full details of the technique of titrating the antihæmolysin in human serum was prepared in these laboratories and distributed at the January meeting of the Association of Clinical Pathologists.

CIRCULATING ANTITOXIN IN HUMAN DISEASE BEFORE TREATMENT WITH TOXOID OR ANTITOXIN

A number of papers, giving the results of titrations, have recently appeared in Australia, Germany, and Canada, but there has unfortunately been no common standard of reference, and the method of expressing the values, usually in terms of arbitrary "units," has made it difficult to compare the results obtained in different countries—hence our insistence earlier in this paper that values should be stated in terms of a serum which can later be linked up with an official standard serum. In Australia, Bryce and Burnet (1932) and Connor and McKie (1933) have shown that the antihæmolytic titre is slightly above "normal" in cases of sycosis and other superficial infections; although not markedly raised in patients with boils, it may be very high when carbuncles are present; it is considerably above "normal" in deep-seated infections such as osteomyelitis, and the highest titre recorded was in a case of pyæmia. Very similar findings have been published in Germany by Gross (1933). Once again titres were hardly appreciably raised above the "normal" level in patients with boils and other superficial infections; moderately high titres were recorded in carbuncle, acute osteomyelitis, and purulent arthritis of the knee-joint; the highest titres were in cases of chronic osteomyelitis and perinephritic abscess. Gross has also stated that the presence of antilysin in serum has helped to some extent in the recognition of staphylococcal infection and in appreciating its intensity. In Canada, Dolman (1933) found that the titres in patients with boils were no more and often less than those in "normal" subjects, but he is in agreement with the Australian and Canadian workers that deep-seated infections of bone and muscle give rise to very high titres.

We have not ourselves had an opportunity of titrating large numbers of sera from human patients, but the few titrations we have made with sera from cases of superficial boils and pustular acne have shown considerable variations in titre. Similar differences in titre have, however, occurred in normal individuals.

ACTIVE IMMUNISATION WITH TOXOID

Our experiments in animals have confirmed the observations of others that the amount of circulating antitoxin can be increased by the injection of either toxin or toxoid intracutaneously, subcutaneously, or intravenously. In Table II. are given the titres of the serum of rabbits and human subjects before and after subcutaneous injections of toxoid prepared from the Wood 46 strain.

TABLE II

Immunisation with toxoid, injected subcutaneously

Rabbits.	Total volume injected in c.cm.	Antitoxin as decimal fractions of standard serum K.		Period of observation in weeks.
		Before immun.	After immun.	
1–6	5–8	< 0·003	0·01–0·02	4
7	5	0·01	0·07	
8	8	0·01	0·16	
9	8	0·01	0·16	
Human subjects.		*(Boils and other superficial infections.)*		
1	0·4	< 0·003	0·02	3
2	5	< 0·003	0·03	23
3	4	< 0·003	0·03	18
4	0·35	< 0·003	0·37	4
5	5	0·01	0·02	21
6	5	0·015	0·07	21
7	1·3	0·02	0·05	3

immun. = immunisation.

In a recent paper by Connor and McKie (1934) it is stated that the average titre of circulating antihæmolysin of a group of rabbits rose from nil to 1 in 245 following immunisation with crude toxoid. When concentrated toxoid, which is known to cause less reaction in human subjects, was injected into another group, the rise in titre was less marked—viz., from nil to 1 in 145. A third group injected with vaccines prepared from toxigenic staphylococci (unphenolised and unheated) showed a slight but still appreciable rise (from nil to 1 in 42), which may possibly in part explain the good results that sometimes follow the therapeutic use of vaccines. Our experiments have confirmed Connor and McKie's conclusions that crude toxoid is an efficient antigen.

Some of the human subjects in our series had suffered from furunculosis for some years, and had recently had one or more boils when the course was commenced; a few of our patients have ascribed the rapid disappearance of their boils to the injections. The initial dosage in this and a later group now being immunised has been 0·05 to 0·1 c.cm. of toxoid B.8300. Injections have been repeated at intervals of 4 to 7 days, the volume being increased, in the absence of reaction, in 3 or 4 injections up to 0·75 c.cm. Rather severe local reactions have been encountered in some patients, but others have tolerated 1·0 c.cm. of toxoid without discomfort, a dose which is not, however, recommended for routine use. Dolman (1933) has reported an alleviation of symptoms coinciding with the increased titre of antihæmolysin during immunisation. The rise was more pronounced where the lesions were deep-seated, in which case the titres before treatment were also higher than in patients with more superficial infections. It is possible that here we are dealing with a "secondary stimulus" response. Probably the mechanism is also at work in human subject No. 4 (Table II.), in whom the injection of only 0·35 c.cm. of toxoid has resulted in more than a hundredfold increase in circulating antitoxin. In such a subject in whom the antitoxin-producing mechanism appears to respond to a minimal stimulus, it is easy to imagine a very marked rise in antitoxin following the injection of vaccines containing only traces of toxin or toxoid. A "secondary stimulus" response has also been noticed by us in rabbits which have previously been immunised with toxoid and then allowed to rest for some months. Connor and McKie's series (1934) included 18 cases of sycosis, a condition with little tendency to spontaneous cure; in 10 there was disappearance of the lesions, and in 4 others marked improvement. In a patient with carbuncle who had a relapse, the titre which had risen from 26 to 830 "units" had fallen again to 225.

Further evidence that active immunisation with toxoid protects against infection can be deduced from animal experimentation. We have injected cultures of the Bundaberg and Wood 46 strains of staphylococcus intradermally into normal and immunised guinea-pigs and rabbits, and found a very high degree of resistance to pyogenic lesions in the skin of the immunised animals. Immunised rabbits too have survived the intravenous injection not only of many lethal doses of toxin, but also of culture; in certain instances the immunised animals have been alive and well after two months, although so high a degree of protection is unusual. In one such experiment (Table III.) the course of the septicæmia has been followed, counts having been made of the numbers of staphylococci which appeared on plates inoculated at intervals with two drops of blood.

In both immune and normal rabbits there has been a rapid fall in the number of organisms present in the blood, but the immunised animals have shown a diminution in the degree of the septicæmia at an earlier period than in the case of the control group. Post-mortem examination of the control rabbits revealed large engorged kidneys from which films showed pus and staphylococci; in one rabbit numerous small abscesses were present, especially in the renal cortex. All the experiments carried out with actively immune animals suggest that circulating antitoxin is of value in combating infection with virulent staphylococci.

TABLE III

Living culture, Wood 86 strain (20,000 million organisms) injected intravenously into rabbits immunised with toxoid

Rabbit.	Titre of serum.*	Number of colonies per 2 drops of blood.						—
		Immediately.	3 hrs.	5	23	30	48	
Immune.								
1	0·02	Numerous	32	68	2	2	0	W.N.†
2	0·015	,,	3	16	21	5	0	A.‡
3	0·01	,,	8	8	2	0	0	
Controls.								
1	<0·003	,,	184	372	D.	—	—	—
2	<0·003	,,	500	57	D.	—	—	—
3	<0·003	,,	158	77	23	0	D.	—

D. = died. * Expressed as decimal fractions of standard serum K. † W.N. = Developed wry-neck. Killed third day. ‡ A. = Alive after two months.

PASSIVE IMMUNISATION WITH ANTITOXIN

As with active so with passive immunisation. Rabbits, guinea-pigs, and mice can readily be protected by means of antitoxin against many lethal doses of toxin, but protection against virulent culture has in general been much less complete, the immunised animals eventually dying in most instances from pyæmic infection.

A protection experiment with potent concentrated antitoxin has recently been carried out on eight groups of four mice, 32 animals in all, using 0·6 c.cm. of a 10,000 million suspension of living virulent culture, injected intraperitoneally, as the infecting dose. Four control animals died within 24 hours, and four mice, which had received 0·05 c.cm. of serum subcutaneously seven hours before the culture injection, survived for 48 hours. With increasing doses of serum the period of survival of the groups of four mice increased, until, of the last three groups which had received 0·6, 0·8, and 1·0 c.cm. of serum respectively, three mice were still alive after one month, and 10 had lived for longer periods than 10 days.

The results of a passive protection experiment in rabbits have shown that, while control animals died as a rule in 6 to 16 hours, 11 animals which had had varying amounts of serum intravenously immediately before the intravenous injection of virulent culture survived from 4 to 30 days. Another group of six rabbits which had been injected with antitoxin intravenously 24 hours before the virulent culture in the same experiment showed even better protection, for five were still alive and well after one month. It has been rare in our experiments to get protection as complete as in this experiment.

Closely analogous results have been obtained in hæmolytic streptococcal infections in the rabbit (Parish and Okell, 1927). They showed that rabbits can be protected by antitoxic serum against acute toxæmic death following the intravenous injection of large doses of living culture of hæmolytic streptococci, but that in most instances the surviving rabbits develop arthritis towards the end of the first week or later, and eventually succumb to the pyogenic assault of the coccus. (In staphylococcal infections in the rabbit arthritis does occur, but abscess-formation in the tissues and abnormalities of the bone-marrow are more common.) But even if serum, staphylococcal as well as streptococcal, can only combat early toxæmia, there would appear to be abundant indication for its employment clinically. The evidence adduced by Panton, Valentine, and Dix (1931) lends support to this contention.

Much further work is obviously necessary to establish the value of both staphylococcal toxoid and antitoxin in clinical medicine. It is suggested that frequent titrations of the antihæmolysin present in the patient's serum, by a method similar to that described earlier in this paper, should be carried out while this research is in progress, so that valuable data may be acquired as to the precise rôle of circulating antitoxin in combating infection and influencing prognosis.

SUMMARY

1. Toxins of various strains of staphylococcus vary widely in potency. Lightly coloured variants of *aureus* strains produce more potent toxins than the parent cultures. The guinea-pig intradermic value (combining power) of toxin approximates to the hæmolytic value, when rabbit corpuscles are used.

2. A simple technique is described for titrating the antitoxin (antihæmolysin) in the serum of patients.

3. The sera of numerous laboratory animals and human subjects contain appreciable amounts of "natural" antitoxin. In human staphylococcal diseases there may be wide variations in antihæmolytic titre, the highest value being obtained in deep-seated infections—e.g., of bone and muscle.

4. Active immunisation with toxoid leads to an increase in circulating antitoxin, and affords protection against infection, at least in laboratory animals. Clinical data are accumulating, showing the value of toxoid in the treatment of subacute and chronic staphylococcal conditions in man.

5. Antitoxin protects laboratory animals passively against many lethal doses of toxin. When given to mice and rabbits before a certainly fatal dose of living culture it prolongs and in some cases saves life. It is thus a rational form of therapy in human infection, in which preliminary reports of its usefulness are not discouraging.

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A CASE OF
ANAEROBIC MENINGITIS FOLLOWING MUMPS

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Brain abscess and purulent meningitis associated with anaerobic micro-organisms occur not infrequently as complications of such conditions as chronic otitis media and pulmonary abscess, and more rarely by metastasis from other sites. The following case presents certain unusual features.

CASE RECORD

The patient was an overgrown lad, aged 16, working as a shop assistant. Seven cases of mumps had occurred in his family, and he contracted the illness himself on April 15th, 1933. The attack was a severe one with persistent fever. Ten days from the onset he complained of headache and stiffness of the back of the neck but no changes in the reflexes could be determined. Kernig's sign was negative. The tongue was heavily coated but moist; the mouth was foul with marked halitosis. Pain in the neck became severe during the next three days, mainly along the posterior border of the left sternomastoid. The temperature was 100·8° F. No evidence of otitis media, furunculosis, or pulmonary involvement could be obtained throughout the illness. Apart from the temperature and the pain in the neck nothing abnormal was found at this time.

The temperature fell to 98° F. on April 30th, but during that night the patient had delirium, and on the following night a shivering attack. The pain in the neck and stiffness grew worse. On May 2nd the plantar reflex became extensor on the right and doubtful on the left. Of the abdominal reflexes only the right upper could be elicited. Other reflexes were normal, except for slight bilateral ankle-clonus. The temperature was 102° F. Two days later (May 4th) enlargement of the upper left posterior cervical glands was noticed. Both plantar reflexes were then flexor. The glandular enlargement was marked on the following day and now involved the left supraclavicular group. Slight bilateral ankle-clonus could still be elicited. During the next few days the patient became mentally confused and showed signs of cerebral irritation. Kernig's sign remained negative. There was slight "fluffiness" of both optic discs, but no definite papillœdema.

Lumbar puncture was done on May 7th, and about 10 c.cm. of turbid cerebro-spinal fluid were withdrawn. The fluid was under pressure. The patient was rational on the following day and the temperature had fallen to 99·5° F. Turbid cerebro-spinal fluid was again withdrawn but not under pressure. On May 9th there was slight head retraction, headache was less severe, and ankle-clonus was now absent. The pulse was markedly dicrotic. Lumbar puncture yielded blood-stained fluid under slight pressure. The upper part of the swelling of the left side of the neck in the suboccipital region was now fluctuating, and this was incised under nitrous oxide anæsthesia on May 10th. Much foul chocolate-coloured pus was evacuated, and the abscess cavity was found to extend down to the bone. That evening the temperature had fallen from 101° to 99° F., and the patient was quite rational. He felt fairly well during the next two days on both of which lumbar puncture was done, but on May 13th he became worse, with marked head retraction and nocturnal delirium. On the 14th he had slight periodic tremor of all four limbs. There was now spreading cellulitis of the neck and a considerable secondary hæmorrhage from the wound. 5 c.cm. of turbid cerebro-spinal fluid were withdrawn by lumbar puncture. The patient died on the following day. Post-mortem examination could not be obtained.

LABORATORY FINDINGS

Specimens of cerebro-spinal fluid were examined on May 7th, 8th, 9th, and 11th, the material being delivered at the laboratory within two hours of withdrawal by lumbar puncture. The fluid of May 7th and 8th was distinctly turbid. Examination showed white cells over 5000 per c.mm. (polymorphs, 89 per cent.; small lymphocytes, 8 per cent.; large mononuclears, 3 per cent.). Nonne Apelt phase II, positive; Fehling's solution, not reduced; chlorides, 680 mg. per 100 c.cm. No micro-organisms of any kind could be detected in stained films from the centrifuged deposit, and cultures, both aerobic and anaerobic, yielded no growth after 14 days' incubation at 37° C. The fluid of May 9th was heavily blood-stained, but no organisms were seen, and cultures from the centrifuged deposit and of the clot yielded no growth. The fluid obtained on May 11th (the day following incision of the abscess) showed the same cytology and chemical characters as those of May 7th and 8th, but now great numbers of streptococci and slender Gram-negative bacilli were present. Aerobic cultures failed to yield growth, but both organisms appeared in anaerobic culture.

The pus withdrawn from the suboccipital abscess on May 10th was chocolate coloured and very foul. Cells were practically all polymorphonuclears with much detritus. Large numbers of streptococci and slender Gram-negative sluggishly motile bacilli were seen, and these were cultivated anaerobically. Primary aerobic culture failed. Examination by dark-ground illumination was made of the deposit from the various specimens of cerebro-spinal fluid and of the pus from the abscess, but in no case were any organisms of spirochætal type seen. Inoculations for aerobic culture were made by heavy streak sowings upon slants of agar fortified by 1 per cent. human blood, 1 per cent. glucose, peptic digest blood agar (Fildes) and 5 per cent. rabbit serum agar. Anaerobic culture was made by serial dilution shake in 6″ × ½″ tubes containing an 8 c.cm. column of a similar range of media. Cultures were incubated at 37° C., and examined daily over a period of 14 days.

CHARACTERS OF THE MICRO-ORGANISMS

As stated, no growth was obtained in primary cultures on slants under aerobic conditions. In deep shake cultures growth appeared in from four to five days about 3 cm. from the surface. Colonies were then isolated by cutting the tubes in the usual way. The streptococci, after three or four subcultures in deep stab, came to grow readily on the surface and could then be cultivated on plates aerobically. They proved to be of *viridans* type. The bacilli, occurring as pale yellow ovoid colonies of hazy outline, were slender rods, varying in length from 4 to 12 µ, and were pointed at both ends. They exhibited no pleomorphism and were Gram-negative and non-acid-fast. Sluggish motility was observed in individuals from young colonies. Repeated examination by dark-ground illumination failed to show any spiral forms in these cultures. Similar organisms were obtained from the cerebro-spinal fluid and from the abscess pus. Growth of the bacilli in subculture was poor and failed entirely after the fourth subculture. It was not possible to carry out pathogenicity experiments on animals.

DISCUSSION

Several cases of meningitis or brain abscess associated with a mixed infection by anaerobic fusiform bacilli and cocci are noted in the literature. Von Hibler[1] describes a brain abscess in which Gram-positive cocci and anaerobic bacilli were found; Russ[2] describes an influenza-like bacillus associated with a streptococcus. Dick[3] at post-mortem examination found: (*a*) slender Gram-negative bacilli and *Streptococcus viridans* in purulent meningitis following otitis media; (*b*) fusiform bacilli and pneumococcus in basal meningitis following bronchiectasis; and (*c*) fusiform bacilli and *S. viridans* in the pus from cerebellar abscess and purulent lepto-meningitis. Ghon, Mucha, and Müller[4, 5] record three different types of anaerobic bacilli found in cases of meningitis: (1) a small Gram-negative bacillus tending to form chains; (2) a motile bacillus "resembling *B. typhosus*"; and (3) a slender motile bacillus associated with Gram-positive cocci. The fusiform bacillus isolated in the present case appears to resemble the third type of Ghon, Mucha, and Müller, and also that designated Type II. by Smith,[6] although it showed no tendency to develop spiral forms on culture as invariably found by Smith and Tunnicliff in Type II. The association of fusiform bacilli, spirochætes, vibrios, and cocci in various combinations is well known in such conditions as Vincent's angina, necrotic gingivitis, pulmonary abscess, and gangrene and chronic otitis. Spread may occur from these sites to a great variety of situations in the body either by direct extension or by metastasis, and brain abscess and purulent meningitis is not an unusual complication of these conditions. As regards the pathogenicity of these various anaerobic organisms, inoculation experiments in guinea-pigs and mice have shown that while any one of the members of the association has little or only very modified pathogenic properties, combinations of them can be made to reproduce conditions similar to those of the lesions from which the organisms were originally isolated. Smith,[7] working with various combinations of fusiform bacilli, spirochætes, vibrios, and cocci, found that only when spirochætes were present in the combination were the foul necrotic conditions of the original lesion reproduced. In the present case, although the pus from the abscess was characteristically foul, spiral forms could not be demonstrated by dark-ground illumination or on culture. Pathogenicity experiments were not carried out.

The train of symptoms in the present case suggests that pus-formation occurred first in or near the occipital bone. It is known that the organisms of the group occasionally invade bone either metastatically or directly, producing osteomyelitis with widespread necrosis. Seecoff [8] records a case of osteomyelitis of the frontal bone following infection of the frontal, ethmoidal, and sphenoidal sinuses by anaerobes of this group. The infection spread through the diploë and death resulted from meningitis. Silberschmidt [9] reports a metastatic abscess of the femur, and Zinserling [10] mentions direct spread from a gangrenous lung involving the destruction of several vertebræ. The external abscess in the present case was found to extend down to bone. It is significant that slight signs of intracranial involvement appeared before any swelling was detectable externally, although there was stiffness and pain at the back of the neck. The aggravation of the intracranial symptoms and the development of the external swelling proceeded more or less concurrently. It would appear that pus had formed on both aspects of the occipital bone, producing the external abscess on the one hand and an extradural abscess on the other. The earlier specimens of cerebro-spinal fluid were definitely purulent but sterile, and this is not uncommonly found with suppuration close to but not involving the meninges. Such a finding would be consistent with the presence of an extradural abscess. The final infection of the meninges indicates the rupture of this abscess internally.

The origin of the infection must remain conjectural. Autopsy was not obtained and clinical examination during the course of the illness failed to show anything definitely suggestive. It is possible that the infection originated in the mouth, which was foul throughout, but it is noteworthy that at no time was there clinical enlargement or tenderness in the anterior group of cervical glands. Fusiform bacilli and *Streptococcus viridans* have been found by Davis and Mulholland [11] and by Gilmer and Moody [12] to be the preponderant organismal association in cases of periapical abscess. In a case of anaerobic brain abscess described by Worster-Drought,[13] pyorrhœa alveolaris was the only abnormality found at post-mortem.

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COPPER STRIPS FOR SPLITTING PLASTERS

AND A PLASTER OPENING TOOL

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PLASTER-OF-PARIS bandages are nowadays frequently applied next the skin and their removal is often a tedious process. There are numerous occasions when it is wise to split a plaster while it is still wet in order to forestall the swelling which will follow an operation or recent fracture. There must be many who have spent a wearisome hour splitting a next-the-skin plaster with a knife the day after it was applied.

There is no reason why this should not be done while the plaster is still wet provided that steps are immediately taken to maintain the close fit of the plaster until it is dry. The difficulty hitherto has been technical, because the various methods of doing it have certain disadvantages.

The time-honoured strips of lead were perhaps the best of a bad lot; while the plaster was drying, a sharp scalpel was used to cut down upon the previously inserted metal, which was then tilted slightly on its side and wriggled out of the incision. If the strips were made narrow they came out quite nicely but the knife occasionally transgressed their limits; if the strips were wider there was difficulty in getting them out of the incision without spoiling the plaster, and in both cases a sharp knife might go right through the lead unless it was so thick and heavy that it made a deep mark on the inside of the plaster.

The fingers or toes of a limb are almost always left outside the plaster-of-Paris, and consequently a strip of soft metal can be pulled straight out longitudinally after the knife has cut down upon it. This method obviates all the difficulties of the other inasmuch as we are not restricted in the width of metal used and can choose a material which is highly malleable but sufficiently resistant to a knife to be used very thin.

Soft annealed copper strips are excellent for the purpose and slide easily if they are greased with vaseline. One only is used unless a bivalved plaster is required, in which case one is laid along the front and one along the back of the limb. In the ordinary way, when plaster-of-Paris is to be applied to a limb, one of these strips is placed along its anterior aspect and secured with a few turns of plaster-of-Paris bandage or held by an assistant. The plaster is then completed and a sharp scalpel cuts down upon the copper strip throughout its length, dividing every strand until it is clear that nothing remains bridging the gap. A bandage, plaster, or a series of webbing straps then closes the gap throughout its length and the copper strip is pulled out from one end. This is done by a metal handle which is slipped across the strip and grips it with a couple of turns before the strip is pulled out. The split plaster is now allowed to dry and need only be opened if necessity arises.

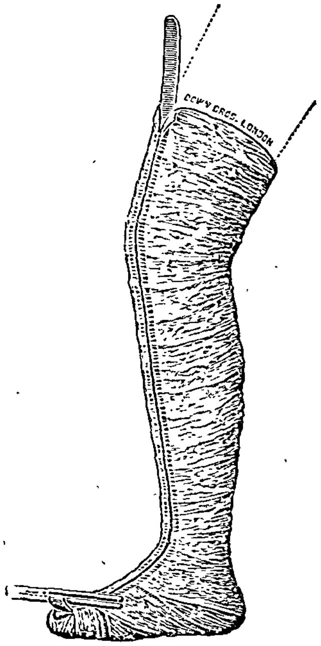

FIG. 1.—Copper strip in position. The plaster has been cut while still wet and the copper strip is about to be withdrawn.

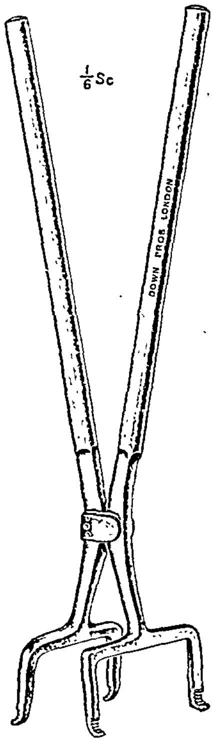

FIG. 2.—Plaster openers.

If plaster is applied over dressings, flannel bandage, or wool, the same technique is followed except that the copper strip is then placed next this instead of next the skin.

It might be thought that a plaster would be greatly weakened by a split throughout its length, but I have not found it so and I now often use these copper strips when applying plaster-of-Paris.

Removal of the plaster is greatly facilitated by the split in the plaster and is usually the work of a few seconds if the proper plaster opener is at hand.

This is a large double-pronged lever which takes apart rather like a pair of midwifery forceps and is inserted, one pair of levers at a time, into the chink in the plaster. The two parts of the plaster opener are then locked into position and the plaster levered open. It depends on the length of the plaster whether the opener has to be inserted in more than one place, but in any event it is a simple matter to repeat the process or to use a second plaster opener higher up the limb. It will be noticed from the shape of the lower ends and their radius of action that there is no risk of the levers injuring the limb if they have once been properly inserted.

The copper strips are made in sets of four (two of 18 in. long and one each of 26 and 32 in.). They are all of the same thickness, but the width is 1 in. for the short length and $1\frac{3}{8}$ in. for the longer. Two handles are supplied with each set and they may also be used for rolling out kinks after use, though this is easily done round any circular surface such as a chair leg. If these kinks are not eliminated, the knife may miss an occasional strand of bandage and the division of the plaster be incomplete.

The plaster openers were based on a pattern which has been known in this country for some years but they now bear little resemblance to their origin. The virtue of the copper strips lies in their thinness, malleability, and resistance to a knife. Whether original or not, I venture to think the two make a useful addition to the equipment of any surgeon who works with plaster-of-Paris. Both have been made for me by Messrs. Down Bros., 21, St. Thomas's-street, S.E.1.

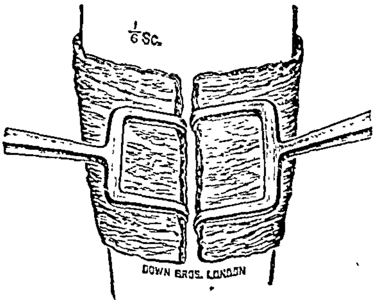

FIG. 3.—Method of inserting the plaster openers.

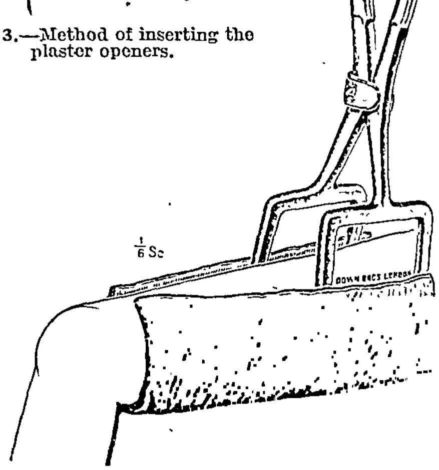

FIG. 4.—Plaster openers in action.

Clinical and Laboratory Notes

A SECOND ATTACK OF PNEUMOCOCCAL MENINGITIS

By J. Gordon Clark, M.D. St. And.
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In December, 1932, I reported a case of pneumococcal meningitis in which the patient recovered (The Lancet, 1932, ii., 1330). I have now to record a second attack of pneumococcal meningitis in the same patient, resulting in death. From a review of the literature it appears that recovery from pneumococcal meningitis is uncommon, only about 50 authentic cases having been described (the first by Jemma in 1896). In none of these cases is there a record of a second attack of pneumococcal meningitis, and in this respect the present case seems to be unique.

First attack.—The patient was aged 29 when the first attack of pneumococcal meningitis occurred on April 16th, 1932. The onset was abrupt, characterised by severe frontal headache. Within five hours he was unconscious, and when admitted to Prof. A. Patrick's ward in Dundee Royal Infirmary seven hours after the onset he was unconscious and violent. With intervals during which he was rational his condition remained the same for 18 days. Then he gradually improved, and when he was discharged from hospital on June 28th he appeared to have recovered. Papillœdema, which had been severe, had subsided, and no visual defect remained. He was examined at monthly intervals thereafter and showed no sign of the disease. On Dec. 7th, 1932, lumbar puncture revealed a normal cerebro-spinal fluid. After that date he did not report again. The diagnosis had been confirmed by culture of pneumococci from the cerebro-spinal fluid.

Second attack.—The patient had been in good health since December, 1932, and had resumed his occupation as a shepherd. Occasionally he had complained of slight frontal headache.

On March 5th, 1934, he had been working during the morning. At midday he complained of severe headache of sudden onset. About 7 P.M. he became unconscious, and on admission to Dundee Royal Infirmary on the following morning he was unconscious and violent. His appearance resembled that observed at the commencement of the first attack of meningitis two years before. The cerebro-spinal fluid was turbid, under normal tension, and contained 11,300 cells per c.mm., all polymorphonuclears. Pneumococci were present in the film, and were grown in pure culture. The organism was found by Prof. W. J. Tulloch to belong to type IV. During the first attack of meningitis, lumbar puncture, performed daily, had appeared to afford relief, and it was proposed to carry out the same treatment during the present illness. His condition failed to improve, however, and he died three days after the onset of the disease on March 8th.

Post-mortem findings.—At autopsy, by Prof. D. F. Cappell, the brain was found to be soft and hyperæmic. Green purulent exudate had collected at the base of the brain and round the brain stem. A thin film of exudate covered the cortex of the cerebral hemispheres. The middle ear on both sides and the cranial sinuses were healthy. There was no evidence of lung consolidation, and there was no respiratory catarrh. No primary focus could be demonstrated which might have been responsible for infection of the meninges.

The clinical picture during the corresponding period in both attacks was similar. The abrupt onset with headache, followed within a few hours by mental excitement, restlessness, and unconsciousness, occurred in both attacks. In the first attack the cerebro-spinal fluid was less turbid, and contained fewer pus cells (1650 per c.mm., as against 11,300 in the second attack). In both no primary focus of infection could be found clinically, and in the second autopsy failed to reveal it.

I am indebted to Prof. Patrick for permission to publish the case.

CHEMICAL SPOT TEST IN DIAGNOSIS OF URÆMIA

By Jocelyn Patterson, M.Sc., Ph.D.
BIOCHEMIST, CHARING CROSS HOSPITAL

(*From the Institute of Pathology, Charing Cross Hospital*)

A TEST diagnostic of high blood-urea was devised by Weltmann and Barrenscheen,[1] who utilised the reaction between urea and p-dimethylaminobenzaldehyde (Ehrlich's reagent), which gives rise to a yellowish-green coloration of somewhat low intensity. Preparatory to applying the reagent to blood they precipitated the proteins with trichloracetic acid, and after filtering developed the colour in a clear filtrate. Blood specimens containing a normal amount of urea (20–40 mg. per 100 c.cm.) developed no perceptible colour, whereas those much above normal in respect to urea content showed the characteristic coloration, which was the more intense the higher the amount of urea present.

The reaction thus outlined, though attention was called to it by Hunt,[2] does not seem to have been employed to any large extent in this country, probably because the time and labour involved is only slightly less than some of the direct Nesslerisation or hypobromite methods, which go further in achieving a roughly quantitative estimation of blood-urea.

For several years past in this laboratory a simpler modification of the reaction has been in use and has proved invaluable in routine work. This consists merely in applying a drop of Ehrlich's reagent directly to a drop of plasma placed on a white filter paper. Where there is much nitrogen retention the spot on the filter paper shows immediately the characteristic greenish colour, no appreciable colour being present with normal or slightly raised blood-urea. More recently attention has been given to the best means of applying the spot reaction directly to whole blood, so as to provide a test which might well be done at the bedside. The technique described below, employing a composite reagent, has been found to work very satisfactorily and takes only one minute to perform on a given sample of blood.

Reagent.—To the Erhlich's reagent (10 g. p-dimethylaminobenzaldehyde, 100 c.cm. concentrated HCl, made up to a total volume of 300 c.cm. with distilled water), add 20 per cent. trichloracetic acid drop by drop with shaking until the cloudiness which forms with each drop just faintly persists.

Technique.—To a small volume of blood placed in a narrow test-tube—a few drops of oxalated finger blood will suffice—add an approximately equal volume of the reagent. Shake the mixture vigorously for a few seconds, and then pour a drop of the somewhat thick coagulum on to a white filter paper. The filtrate spreads as a gradually extending circle, leaving a brown centre of precipitated protein. Attention is then directed to that part of the spot external to the dark centre. With true uræmia the spot shows a distinct green colour. Blood specimens with normal or only slightly raised urea content show no coloration against the white background.

The subsequent development of the outer area of the spot has a certain amount of interest in a confirmatory sense. When dry the degree of yellow of a uræmia spot very slowly intensifies, and after the lapse of several hours the spot becomes a bright canary yellow. Bloods displaying little or no urea retention eventually leave only a dull pale green spot.

The test is of course no substitute for the blood-urea estimation; indeed it ought in general to be followed up by an exact determination. It is, however, eminently suitable for conditions of emergency where it is desired to ascertain at once whether or not there is gross retention of nitrogen.

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[1] Weltmann, O., and Barrenscheen, H. K.: Klin. Woch., 1922, i., 1100.

[2] Hunt, T. C.: THE LANCET, 1929, ii., 751.

SHROPSHIRE ORTHOPÆDIC HOSPITAL.—The long task of reconstructing this institution was reported at the recent annual meeting to be making fair progress. The trustees of the James Laing Trust have given £10,000 for memorials, to form part of the building, of the late James and Nancy Laing. Last year 1328 patients were treated—787 adults and 541 children. The adults stayed on an average 118, and the children 105 days. There was a credit balance on the year of £301.

MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

SECTION OF OBSTETRICS AND GYNÆCOLOGY

AT a meeting of this section on May 11th, with Dr. J. S. FAIRBAIRN in the chair, the subject of discussion was

Genital Prolapse

Mr. VICTOR BONNEY, in opening, said that the distressing charge had often been levelled against gynæcologists that no two of them held the same views about anything, and in respect to the cause of genital prolapse in women there seemed some justification for the criticism. He quoted varying views from a dozen current text-books on the matter, and submitted that the time had now arrived for a general consensus of opinion on the mechanism of prolapse. He contended that, contrary to the view underlying the expression "falling of the womb," prolapse was a purely vaginal phenomenon, one in which the uterus did not play a part; indeed the latter might constitute a hindrance to the prolapse. The vagina, in its relation to the peritoneal cavity, was best considered as a cul-de-sac which was intruded into a closed cavity the pressure within which was liable to sudden rises. The intra-abdominal pressure depended partly on the gas pressure in the intestines, partly on the muscular contraction of the parietes, and partly on the weight of the movable viscera. A perfectly free thin-walled cul-de-sac so situated would turn inside out when pressure in the closed cavity was raised sufficiently. So also would the vagina when the intraperitoneal pressure rose were it not for the ingenious mechanism evolved by nature to prevent it. Mr. Bonney regarded the cardinal ligaments as being more important in the occurrence of prolapse than the so-called pelvic floor. A mere bulging of the parietes would drag on the vagina but would not turn it inside out. He preferred the term "cardinal ligaments" to "utero-sacral ligaments." The worst cases of prolapse seen were those in women past the menopause. Prolapse manifested itself in forms which varied according to which structures were defective in the supporting architecture of the vagina, and Mr. Bonney described in detail and showed illustrations of the various operations which had been devised to deal with them. No operation, he said, was ideal which did not take into account and rectify or abrogate all the factors which were responsible for the particular deformity; hence no procedure could be regarded as a panacea for all cases.

Prof. FLETCHER SHAW directed his remarks especially to treatment. It was said that in Manchester all cases of prolapse were treated by one operation, but each case was, in fact, dealt with as its particular features required. In one case there might be more cystocele, in another more rectocele. The most important parts were those above the muscle and those attached to the muscle itself. The general principle in treatment, however, was to tighten up the parametrium and the muscle lower down to the levatores ani. It was not removal of vaginal tissue which was important, but the stitching of the deep tissues. In practically all the cases the uterus was left in an anteverted position and therefore maintained in anteversion. In the operation he did not rely on the reduction in size of the vagina by removal of vaginal mucosa, though a certain amount was removed. A factor common to every case of prolapse was some weakening of the muscular floor of the pelvis, due either to congenital or development causes, or, more commonly, to damage during labour. In most cases, however, there was an additional cause, sometimes increased abdominal pressure as in factory workers. This probably accounted for many cases seen in the north of England in virgins. The weight of a fibroid of the uterus or subinvolution of the uterus might be a factor. Prof. Fletcher Shaw said that his figures took account only of results that had persisted for at least three years. In 529 cases of operation for prolapse there were no deaths and at his hospital the unsatisfactory cases numbered only 20 (or 3·64 per cent.), and these 20 included those who experienced any symptoms at all since the operation; 5 had had subsequent confinements and 4 failed to come for further examination. In those confined again it was reasonable to suppose that the subsequent labour caused recurrence of the prolapse. Eight had some laxity of the posterior fornix very difficult to cure. During 25 years Prof. Fletcher Shaw had had 9 deaths following this operation, the causes including pneumonia, heart failure, embolism, cystitis, pyelitis. Only 27 of the women in his series had had children after the operation; the tendency was to defer the operation until they had had what they regarded as a reasonable family; 22 of them were all right, while 5 had had a recurrence. In his experience there was practically never any difficulty with subsequent labour which was mostly easier and shorter, because part of the cervix had been removed. In patients operated upon over 50 years of age there were 97 per cent. of cures; in the 4 cases not cured the disability was very slight. A number of the cured cases ranged in age from 70 to 75. In nulliparæ the cures from the operation were 96·9 per cent. The belief of himself and his colleagues was that the pelvic organs were held in place by the muscular tissue and the parametrium, and that prolapse meant that these tissues were weakened by some such cause as he had referred to. It was also their belief that all these cases could be cured by the operation which had been devised for buttressing, shortening, and firming up the tissue concerned. The results of the operation had been, in the experience of Manchester, excellent.

Prof. A. LEYLAND ROBINSON based his remarks on the assumption that descent was due to weakness of the supports of the genital apparatus, or to an increase of strain upon them. Congenital defect was fairly common; it was shown in the rapid onset of symptoms in young primiparæ after normal labour. With regard to acquired predisposition, the efficiency of the structures supporting the birth canal could be impaired in two ways: by lacerations, causing severe mechanical defects, or by muscular weakness or atrophy induced by subinvolution, the menopause, or severe debility. Any injury was, naturally, at once attended to, but loss of muscle tone might supervene after a normal delivery, or might be associated with hidden injuries, such as internal rupture of the levatores muscles. In the absence of actual injury this lowering of muscle tone was apt to be overlooked until the onset of symptoms drew attention to prolapse. In a woman with inherent muscle weakness any such factor as increased abdominal pressure, constipation, over-work, bronchitis, could initiate descent.

As to prevention, any procedure which protected the pelvic muscles from undue pressure, over-stretching, or laceration would deter descent of uterus and vagina. The condition of the pelvic floor should have an influence in deciding as to the mode of delivery in any given case. He emphasised the importance of episiotomy for the prevention of prolapse. Pessaries were useful (1) for diagnosis, (2) as a temporary measure for healthy parous women, and (3) as a palliative. Operation the speaker regarded as curative only after the cessation of the childbearing period of life, but surgery might be needed for the repair of injuries or to relieve symptoms. He recognised two clinical groups of cases, according to whether the defect was in the middle and upper or lower supports of the birth canal. He was a firm believer in the efficiency of vaginal operations for the cure of prolapse. His experience with over a thousand cases had convinced him of the soundness of the so-called "Manchester operation," which he analysed to show its advantages. By its means the length of the vagina was increased rather than diminished, the external contours reappeared, and the normal functions of the vulva as a shock-absorber and a barrier to infection were restored to the patient.

The **PRESIDENT** said he considered that the method described by Prof. Robinson of tightening the utero-sacral ligaments was valuable as it avoided the tendency mentioned by Prof. Fletcher Shaw as a common cause of failure for the posterior fornix to come down.

Prof. V. B. **GREEN-ARMYTAGE** held that in this country gynæcologists were prone to be too conservative in these matters, and to adhere to one particular kind of operation. He thought that close adherence to the operation of the Manchester school had blinded gynæcologists to the defects and disadvantages of that procedure. In America and several continental countries prolapse cases were divided into three categories: (1) the woman with prolapse who wanted more children—for her, a modified Manchester operation without amputation of the cervix gave this possibility and made a cure; (2) the woman with prolapse who did not want more children—here the interposition operation gave excellent results; (3) the woman over 45, for whom the valuable Mayo-Ward operation could be performed; it took only 30 minutes. Prolapse in virgins under 20 years of age was one of the chief bugbears of the specialty, and he would have liked to hear particulars of the method by which Prof. Fletcher Shaw dealt with these cases.

Mr. J. M. **WYATT** said he did not remember to have seen a case of prolapse in a virgin under 40 years of age unless there was a fractured pelvis. As to the strain of work, he believed that young women worked as hard in London as elsewhere, yet they did not seem to suffer from prolapse due to this cause. He believed prolapse was often due to severe strain short of laceration. Sometimes after prolonged labour prolapse took place, but without any perineal tear, whereas a quicker delivery, even if accompanied by a tear, did not result in prolapse. He had seen many cases in which the prolapse was limited to the lower vagina; they were cases of low rectocele or low cystocele, and he did not think the Fothergill operation was of value in dealing with such cases.

Mr. J. **CHASSAR MOIR** remarked that Prof. Fletcher Shaw had described what he termed the important deep stitching to brace the uterus, and then, he said, he amputated the cervix. Dr. Moir would like to know why this last was done. It meant primary bleeding, and probably secondary bleeding at the end of a week. He had sometimes known considerable hæmorrhage occur after the Manchester operation, and would like to know how this could best be avoided.

Mr. **BONNEY**, in reply, said the debate had shown that the three openers were substantially in agreement, but the text-books on the subject did not reveal such harmony, or what prolapse essentially consisted of. He still did not think that the uterus had anything to do with prolapse: in fact the larger the uterus the more definite the resistance it offered to the occurrence of prolapse. Mr. Bonney did not regard the interposition operation as a good procedure. It was not an anatomical operation and was not comparable with the Fothergill, or the other operations usually performed at that site. It seemed to act partly by pulling on the cardinal ligaments, partly by reinforcing the anterior vaginal wall. Not only for the sake of patients and operators, but also that of students, he hoped agreement on the nature of genital prolapse would be attained.

Prof. **FLETCHER SHAW** replied that all three openers were agreed that in every case of prolapse there was a deficiency in the supporting structures, as a result of either congenital weakness or of some damage. He still thought that the weight of the uterus had some effect in bringing about prolapse, but only in the presence of such weakness as he mentioned. He thought the figures he was able to produce were sufficient justification for loyalty to the Manchester operation. He did not think the interposition operation was ever required for prolapse. In almost every case he removed the cervix but there were a few exceptions. Even if the cervix appeared to be normal, the use of sutures pushed it further down the vagina. Hæmorrhage might occur at the end of seven days, and that he regarded as evidence of sepsis. If the first indication was overlooked there might be trouble. Practically always when bleeding occurred it was from the cervix. If the urine was turbid, cystitis should always be suspected, the urine examined microscopically, and, if infected, treated before any operation was performed.

MEDICAL SOCIETY OF LONDON

As the subject for the annual oration delivered on May 14th Prof. G. E. **GASK** chose

Clean Wounds, Ancient and Modern

remarking that it might come as a surprise to some of his hearers to learn that modern aseptic surgery, of which we are so proud, is not entirely the product of our generation. There were at least two previous periods in past ages in which clean and rational surgery was practised. On a roll of papyrus 5000 years old which came into the possession of an American Egyptologist, Mr. Edwin Smith, during the American Civil War, was given by his daughter to the New York Historical Society in 1906, was translated by James Henry Breasted and published in 1930, is a description of 48 cases, written in a style which suggests that it was for the instruction of students. Details are given of a number of flesh wounds: the treatment being similar in all cases, it may be inferred that it was the accepted practice of the time. In the first place the wound was to be closed by stitching, and from the fact that the stitching is mentioned early and is included in the diagnosis, we may conclude that the wound was to be closed at the earliest possible moment. In the second place fresh meat was to be bound upon the wound for the first day, and for the first day only. In the third place the stitching was to be loose, the edges of the wound being drawn together by two strips, presumably of plaster. Finally the wound was to be dressed with grease and honey every day until healed. Fresh bleeding meat is a useful styptic and may assist bactericidal action. Honey is the same as the treatment with hypertonic solution introduced by Sir Almroth Wright.

The Hippocratic method of treating wounds, said Prof. Gask, compared favourably with that of modern times. Water for washing wounds was filtered or boiled. Dressings were of new material, and the hands and nails of the operator were cleaned. Their local medications were wine and oil. As Greece declined, the Grecian school shifted to Alexandria and later to Italy. Galen, who worked in Rome about A.D. 150, was described as the founder of experimental medicine. He taught the world much, but he tried to explain everything in the light of pure theory instead of by careful observation and interpretation of facts. Some of his doctrines, accepted as gospel truth, had much to do with preventing the advancement of medical science. One of the most notable of these superstitions was the Galenic doctrine that "coction," or suppuration as we would now call it, was an essential part of the healing of wounds. This damnable doctrine was handed down from generation to generation until it was disproved by Lister.

Hugh of Lucca, known only through the works of his son, Theodoric (Teodorico Borgognoni), who completed his book on surgery in 1266, recognised that suppuration is not a necessary stage in the healing of a wound. "It is not necessary," he wrote, "to place a poultice over a suture, as the stupid do, . . . to generate pus in wounds, as almost all modern surgeons profess. No error can be greater than this. It is nothing else but to hinder nature, to prolong the disease . . . and what is worse the unskilful bring it about with their cures that flat wounds suppurate and hollow ones become fistulous." Theodoric's pupil, Henri de Mondeville, has left a vivid picture of the contemporary method of treating wounds, which he called the treatment of the ancients, adding "By this treatment more patients die than recover and the convalescence of those that survive the treatment is prolonged for three months." He himself elaborated a form of treatment of wounds and gave practical proof of the value of his treatment which must have convinced all but those who did not wish to see. These were his instructions :—

> Do not probe wounds.
> Remove all foreign bodies.
> Approximate the lips of the wound as much as possible and suture them if necessary.
> Foment afterwards with warm wine.
> Dry them with pledgets soaked in wine.
> Apply a plaster spread on a piece of tissue and cover it again with pledgets wrung out in wine.
> Bandage according to the rules of the art.

He believed and proved by experiment that suppuration was not an essential phase of healing, and that wounds properly treated "heal in a little time, without pain, and with a single dressing." But after his death his treatment fell into disuse.

Passing on to the middle of the nineteenth century, Prof. Gask invited his hearers to the small chemical laboratory attached to a brewery in Lille, where Pasteur's discovery that fermentation and putrefaction were due to the action of living organisms made possible the progress of modern surgery and preventive medicine. Lister seized on Pasteur's discovery and with it made surgery safe for humanity. He had long wondered why Lister chose such an inconvenient antiseptic as carbolic acid when he had heat ready to his hand. Lister must have had good reasons for his choice. What were they ? It was in 1860 that Lister went to Glasgow Infirmary and was distressed at the frightful mortality there of suppurating wounds and the ravages of hospital gangrene. Dr. Thomas Anderson, who had studied under Berzelius and Liebig, was then regius professor of chemistry in the university. Lister and Anderson lived near each other in the West of Glasgow, and it was Anderson who called Lister's attention to Pasteur's discovery of the dependence of putrefaction on minute living organisms. Prof. Gask imagined Lister saying "If these tiny organisms are the cause of putrefaction, it is possible they are the cause of suppuration, and if one could prevent them from entering the wound one might prevent suppuration. It is worth trying." Then it would seem natural for him to turn to Anderson and ask : "How can I kill these organisms ?" As a chemist Anderson was likely to think along chemical lines. A large sewage farm, recently made to the west of Carlisle, had given annoyance by its smells and carbolic acid had been found to be the most efficient preventive. Perhaps Lister made a journey to Carlisle to see for himself what was done ; at all events, he secured some crude carbolic acid and began his investigations.

Had Pasteur been a surgeon he might have chosen heat as his sterilising agent. In fact, when addressing surgeons at the Académie de Médecine in 1874, he said :—

> "Surgical instruments should . . . be put through a flame . . . for this reason : if a sound were examined with a microscope, it would be seen that the surface presents grooves where dusts are harboured, which cannot be completely removed even by the most careful cleansing. Fire entirely destroys these organic dusts ; in my laboratory . . . I never make use of an instrument without previously passing it through a flame."

It is easy enough for us to realise now, Prof. Gask remarked, that heat is the best method of sterilisation, but the fact remains that Lister chose a chemical disinfectant, in the first instance probably because he was told of it by his friend Dr. Anderson, and secondly perhaps because he was looking for a substance which would kill germs which were in the air, as well as those which had already settled in and contaminated the wound. In his later years Lister was filled by the idea that his work had been ineffective. He could not see the need for the modern operating theatre, with its ritual of cleanliness, and he thought the lessons he had taught were wasted. But although much has been done, still more remains to do. Though a surgeon may make a clean wound and carry out intricate operations with the certainty that healing will be swift, he is still almost powerless in the face of an infected wound. Can we say, Prof. Gask asked, that we have materially improved the treatment of pyogenic infections ? Can we cure even a whitlow, or a poisoned wound, with the assurance with which we can make a clean cut ?

WEST END HOSPITAL FOR NERVOUS DISEASES.—Last year there were 585 in-patients and 4000 out-patients, and income exceeded expenditure by £2596. The work of the pathological, neuro-surgical, and psychotherapeutic departments increased substantially during the year, and the staff of the child guidance unit has been nearly doubled to deal with the demands made upon it in its first year of working. The X ray apparatus has been condemned and re-equipment will cost £1000. At the annual meeting last week Lord Harewood, the chairman, announced that the pathological department is to be named after the late Mrs. (Josephine) Marshall, of New York, "in connexion with a generous gift which is to be received from Mr. Charles Marshall and Mrs. Field."

REVIEWS AND NOTICES OF BOOKS

Rheumatism in General Practice

BY MATTHEW B. RAY, D.S.O., M.D. Edin., Senior Physician, the British Red Cross Clinic for Rheumatism; Physician, the St. Marylebone General Dispensary. London: H. K. Lewis and Co., Ltd. 1934. Pp. 404. 16s.

THE development of interest in the rheumatic diseases has resulted in a glut of text-books on different aspects of the subject, though there are relatively few, anyway in the English language, which set out to cover the whole ground. Dr. Ray has succeeded in doing this in a book of quite moderate dimensions. The book is divided into two parts: the first gives a general consideration of the ætiology, clinical features, diagnosis, and treatment of these affections; the second deals with their local manifestations in the various regions of the body. The text is illustrated by six plates, five of which are X ray photographs of the hand in different forms of or different stages of arthritis with a normal hand for comparison. The preliminary chapter covers such considerations as the physiology of the skin, heat regulation, the adaptive functions of the body, the endocrine system, and so on. The next seven chapters are devoted to a detailed description of the various forms of rheumatism and arthritis. Some would criticise the space devoted to rheumatism in children, particularly the section on rheumatic heart disease. It is doubtful whether it is possible to treat usefully so big and important a subject in one chapter. The section on fibrositic affections is admirable, and the anatomical notes are most helpful. There seems no good reason for the distinction, in Chapter VII., between gout and metabolic arthritis, since Dr. Ray states—and it is the common view—that gout is a disorder of metabolism and probably an allergic condition. The two chapters on physical treatment which end the first section will be invaluable to those who are unfamiliar with the methods of physiotherapy.

In the second part of the book each region of the body is considered in turn, with the forms of arthritis that may attack it. From the point of view of diagnosis this section should be most helpful. One omission is worthy of mention. We searched in vain for an account of the so-called climacteric arthritis which has attracted much attention of late years.

This book will interest and inform all those who are interested in the rheumatic diseases. It would be even more useful to the general practitioner for whom it is designed if some expression of personal opinion, some advice on the best lines to pursue, were offered him. The conflicting views are fully and faithfully set out and the choice between them left to the reader. In this sense the book fails to give help where it is needed; in other respects it justifies Lord Horder's warm praise in the "foreword," that it is "the best account of rheumatism in our language."

The Way of all Women

BY M. ESTHER HARDING, M.D., M.R.C.P. With an introduction by C. G. JUNG. London: Longmans, Green and Co. 1933. Pp. 315. 15s.

THIS books aims at interpreting the main problems of woman's life in terms of the psychological system of Dr. C. G. Jung, and it shares the disconcerting qualities of Jung's writings. An elusive intimation is conveyed, throughout, of new and valuable ideas; but the impression is blurred and our anticipations disappointed by the author's limited power of exposition. Just as the reader feels that he is about to get to the core of the argument, his comprehension is frustrated by a lapse into symbolic language, or else by the attribution of a strained ulterior meaning to such words as Truth, Reality, and Life.

Woman, according to Dr. Harding, has to pass through a naïve, a sophisticated, and a "redeemed" phase. When the uncritical victim of the instinctive forces of nature, or of the conventions of the society in which she lives, woman is in the naïve stage. The sophisticated stage characterises the woman of the world, who, intent on power or superiority, exploits men for money or for prestige, or for the satisfaction of her instincts. The flirt, the gold-digger, the scalp-hunter, and the courtesan are instances. Both naïve and sophisticated women belong to a "lower" type. What, the reader expectantly asks, distinguishes the higher or redeemed type? Several answers are given, varying in comprehensibility. Thus the redeemed type of woman is said to be characterised by having discovered a "supra-personal value," such as the ideal of liberty or fraternity, or the love of God, or the study of analytical psychology; by a new orientation of consciousness which centres itself in a non-personal region of the psyche (this non-personal quality should prevent her from using the term "I" to express the new conception of self); by allowing her libido to activate her primordial images and by taking her fantasies seriously; by allegiance to the aims of a part of her self which is in harmony with the movement of Life throughout the generations; by a "deeper" experience of feminine spirituality or Eros; also by the *Reality* of her inner experience and by her contact with inner *Truth.*

In her passage through the above-mentioned stages the woman must learn to distinguish her "individuality" (the differentiation of this entity is the keynote of the whole book) from the "anima" projected upon her by men, and from the "animus" which she herself projects on to men. The "anima" is the ideal of the perfect woman, secretly cherished by all unredeemed men; the animus serves the same function, vice versa, for the woman. We are informed, however, that at times, by a supreme effort, the animus, felt by the woman as a ghostly lover, may be changed into the "redeemed" or "spiritual" animus. These qualifying adjectives do not give us much information about the new kind of animus. How then is a woman to recognise her "redeemed animus"? By the fact, we are told, that through it she gains a relation to the masculine principle in herself, the Logos or Wisdom. "When," says Dr. Harding, "the woman is identified to the animus, she is possessed by influences and rationalisations and so-called principles which do not represent true wisdom at all. These are the work of the ghostly lover. *True* wisdom can be known only through the spiritual or redeemed animus who is a mediator between the conscious and unconscious."

Though the author's failure to clarify the philosophical assumptions of the Jungian system may be regretted, her book contains much that can be warmly praised. The chapters on Work, Friendship, Marriage, and Maternity contain many valuable ideas and useful phrases, and this is also true of those entitled "Off the Beaten Track" and "Autumn and Winter." The book is not written especially for medical readers, but it will be found useful by many of these in affording a picture of normal psychological development which may help them to guide a certain type of neurotic and unstable female patient towards mental stability.

The Singing Voice

By E. R. GARNETT PASSE, M.R.C.S., L.R.C.P., D.L.O., B.D.Sc. With a foreword by CLIVE CAREY. London: Sir Isaac Pitman and Sons. 1933. Pp. 85. 6*s.*

Mr. Clive Carey, in a foreword to this little book, says that it has always been a debatable question as to how far a singer should possess a knowledge of the physiology of the throat, the usual contention being that such knowledge makes him "throat conscious" and is to be discouraged. In his opinion the problem is rather whether the student should learn his art by imitation and sensation alone, or whether he should obtain mastery through conscious knowledge of what he is doing; and he makes the curious remark that some knowledge of the functions of the jaw, palate, tongue, lips, and resonance chambers is necessary to enable him to experience any sensations at all. Dr. Passe begins with an elementary account of the physics of sound and of audition, proceeds to describe the anatomy and physiology of the vocal organs and their action in the production of sound, and concludes with a short chapter on their care; the most valuable part of this latter section is the warning against using the voice when the throat is inflamed. He makes a number of loose statements; some of these are amusing and unimportant, as when he says that small fishes are able to appreciate the vibrations set up in the water by the fins of other fishes of their size and species, whilst these are imperceptible to larger fishes. Others are more serious, such as the statement that the vocal cords actually touch each other all the way along their edges during phonation, and that the nasal cavity is completely shut off by the palate during the singing of vowel-sounds. His description of the mechanism of the formation of vowels and consonants is too incomplete to be of much assistance to the student of singing; indeed, Dr. Passe has been so careful throughout to avoid instruction in the details of voice-production that he has failed to inform the student on many matters which concern him. At any rate he has avoided any risk of making pupils "throat conscious" by too much knowledge.

Practitioner's Library of Medicine and Surgery

Vol. V., *Traumatic Surgery.* Associate Editor: THEODORE S. MOÏSE, B.A., M.D., Surgeon to the Eastern Maine General Hospital, Bangor, U.S.A. London and New York: D. Appleton-Century Company. 1934. Pp. 1080. 50*s.*

THIS volume is but one in a comprehensive series covering the whole subject of surgery, general and orthopædic. Since the aim of the series is to cater for the general practitioner, one is forced both by the scope of the work and by its bulk to consider it as a work of reference. No one outside the sphere of specialised surgery is likely to read the work as a whole. The authors of the various sections of the volume on traumatic surgery have observed to quite different degrees the idea of ready and easily accessible reference. Faced with an accident to treat, the practitioner wants to know primarily what are the symptoms pointing to serious trauma, and how far he is likely to be able to treat the case himself; secondarily, he wants to know how much can be expected for his patient from major surgical interference.

The just balance between these two aspects of the subject is nicely held in the section on traumatic surgery of the genito-urinary tract, which is, incidentally, one of the best in the book. The outlook of the practitioner is rather lost sight of in descriptions of such subjects as operations for rupture of the lesser curvature of the stomach, exploration of the bile-passages, or diagnostic blocking of the sympathetic nerve-supply to the extremities. More practical is the excellent section on pyogenic infections of the hand, with illustrations of actual cases, before and after treatment, and indications of the exact incision employed. The survey of the various types of treatment of burns is full and critical, showing finally the rationale on which the tannic acid method is based. Treatment of septic wounds by the Carrel-Dakin technique is described in detail. Compound fractures are, however, dismissed in four pages, without definite stress having been laid on the necessity of regarding these injuries as among the primary surgical emergencies. The treatment by the closed method of Winnett Orr is not mentioned. Fractures and dislocations occupy nearly 400 pages of the text, and these are not among the best sections. The accounts of fractures in particular are difficult to follow. To say that the tibia is noted for its "inability to unite following fracture" does not seem to get us much further. An illustration of a fracture of the *ulna* (p. 220) is given to show the action of the pronator quadratus in producing displacement of the fractured *radius.* It seems probable that Figs. 154, 176, and 185 are all in their wrong context. There is a curious naïvety about such a remark in a text-book as " . . . one had better call in specialised aid in order to avoid difficulties later. If complications then occur one's mind is at ease with the feeling that all care has been exercised."

In spite of the unevenness of the different sections, there is sufficient material in the volume to repay study, but its value as a work of reference is to those who already have a critical appreciation of surgical problems.

Smoke and the Atmosphere

By J. R. ASHWORTH, D.Sc. Manchester University Press. 1933. Pp. 131. 7*s.* 6*d.*

THIS is a description of experiments made by Dr. Ashworth upon atmospheric pollution in Rochdale. He describes a variety of methods which he has evolved for examining the purity of the air, and his book is certainly a record of great enthusiasm and energy in examining a subject which receives far too little attention.

Many of his experiments were made with wet deposit gauges which, as he points out, give a heavier deposit than dry gauges. The effect of size, position, and exposure of gauges is discussed and also that of wind upon the deposit obtained. The wind is credited with blowing impurities out of the dry gauge, but of failing to do so when rainwater is allowed to collect in the bottom. Dr. Ashworth favours the latter type of gauge, although the dry gauge has been standardised by the Committee for the Investigation of Atmospheric Pollution. This preference for the wet gauge gives rise to some slight discrepancies in the argument. For example, on p. 24, the deposits in Cheltenham and Wakefield are compared and inferences are drawn which are hardly justified in view of the fact that the Cheltenham gauge was a wet one, the Wakefield gauge a standard one. Descriptions are given of the author's "horizontal gauge," which is intended to catch impurities carried horizontally; also of the "daily deposit recorder," which aims at getting the amount of deposit from hour to hour during the day; how far the results obtained by these instruments can be accepted as reliable is a matter of some doubt. It is not easy to measure a deposit as Dr. Ashworth does by simply counting, with the naked eye, the number of particles falling upon a piece of greased paper; the limitations of vision alone would cause the omission from the observed deposit of all particles except the very large ones. Such inferences as that "one million particles weigh almost exactly 1 gramme," can hardly be justified. An interesting theory is advanced to the effect that the rainfall is influenced by the quantity of atmospheric impurity; it was found that Sundays in Rochdale give a lower rainfall than weekdays. A chapter is included on the effect of pollution on light, and the author's photographic method of measuring ultra-violet light is described. There are five appendices and a list of references. The book makes interesting reading for anyone concerned with the problem of atmospheric pollution.

Prof. G. B. HASSIN informs us, in reference to the review of his book on "Histopathology of the Peripheral and Central Nervous Systems," in THE LANCET of March 17th (p. 577), that he has never claimed that hydrocephalus is caused by inability of the choroid plexus to absorb the spinal fluid.

EUGENICS IN PRACTICE

A Series of Essays suggested by the Report of the Brock Committee

II.—THE SOCIAL PROBLEM GROUP

THE most dangerous type of criminal is the one who turns in ordinary society and is accepted at his face value as a respectable citizen. So it is with defect. The potential parent who carries the seed of defect, unknown even to himself until it is too late, constitutes a more intractable problem than the individual who is outwardly and manifestly defective. This is the rock on which any proposals for sterilisation are liable to split.

A PARADOX AND ITS EXPLANATION

The evidence given before the Brock Committee goes to confirm the view that the proportion of mentally deficient persons among the parents of mentally defective children is remarkably small. Several independent investigators report that they failed to discover more than about 5 per cent. in this category. We need not search for any mysterious principle to explain this. The reason is precisely the same as that which determines why black sheep eat less than white—there are fewer of them. The ratio of defectives to carriers of defect, who much more commonly beget defective children, cannot be calculated exactly, but it is estimated to be in all probability less than 1 to 10.

It would, however, be an elementary error in logic to conclude that because defective children seldom have defective parents, therefore defective parents seldom have defective children. Yet this appears to be an inference that is not infrequently drawn. Some go further; they suppose that defect is akin to genius and that, by the sterilisation of persons liable to produce defective offspring, there would be considerable danger of robbing the world of great men. It may be pointed out in passing that such an argument would carry much greater weight if urged against milder methods of birth control practised by people who are intellectually well endowed. But in point of fact the alleged danger is exceedingly slight. On this subject also there is valuable new evidence in the Brock report. In a large sample of 3650 children born to parents at least one of whom was an ascertained defective, collected from different parts of the country, it appears that less than 1 per cent. could be classed as of superior intelligence, and over 40 per cent. were classed as defective or mentally subnormal. In another sample of about 1600 families from Merseyside, each containing a defective child, it was found that when both parents were normal 70 per cent. of the children were normal; when one parent was subnormal—including in this case the mentally retarded, the epileptic, and the insane, as well as those certified to be mentally deficient—the percentage of normal children fell to 57; and when both parents were subnormal the percentage fell to 41.

These figures indicate, and there are other strong grounds for believing, that intelligence (or the lack of it) is largely an inherited character. The first essential step, therefore, if mental deficiency is to be eliminated, is to discover some method of distinguishing the carriers of defect. Since to all appearance there is a continuous gradation of intelligence from the wise to the simple, and there is no clinical method for determining whether a borderline case is defective or not, it might seem a hopeless task to pick out the carrier. But this is not so, for though not certifiable as defective he is frequently subnormal in intelligence or comes from a subnormal class. The same investigators who are quoted in the Brock report as finding no more than 5 per cent. of defectives among the parents of defective children, state that at least 30 per cent. of the parents are persons of low intelligence. The Wood Committee, it may be recalled, discovered that a large number of defectives of the primary amentia type were found in quite a restricted group of families, a group including "a much larger proportion of insane persons, epileptics, paupers, criminals (especially recidivists), unemployables, habitual slum dwellers, prostitutes, inebriates, and other social inefficients than would a group of families not containing mental defectives." It has, in consequence, been termed the Social Problem Group, and the failure in life of the individuals who comprise the group must be attributed primarily to their poor mental endowment. It is possible, the Wood report states, that, although the majority of them are not so low-grade that they can be actually certified as defective, a not inconsiderable number might prove to be certifiable if examined by experienced medical practitioners.

ENVIRONMENT SUPPLEMENTS HEREDITY

These considerations suggest that the most fruitful soil for defect is composed of a mixture of bad environment and weak heredity. Too often in the past parties have taken opposing sides on this question and maintained that all the blame for the persistence of defect must be attributed to one or other of these two factors. For our immediate purpose it is less important to decide, if we could, which plays the chief part than to observe that they supplement each other at every point. To say that intelligence is an inherited factor is not to imply that environment counts for nothing. On the contrary, external conditions—the kind of home in which a child is nurtured and the class of school to which he is sent—have an immense influence in moulding his mentality and in determining what he makes of his talents. The more intelligent the parents, the greater is the chance that the children also will be intelligent; on the other hand, if the parents be half-witted or mentally retarded, the less likely are the children to have an environment calculated to bring out effectively such abilities as they possess. Informed opinion, supported by the investigations of Dr. F. D. Turner and Dr. L. S. Penrose at the Royal Eastern Counties Institution at Colchester, now rather favours the view that while a small proportion of defect is due to purely external causes, *and a decidedly larger proportion is due to* purely hereditary causes, many, and possibly the majority of, defective cases arise from a combination of the two, in the sense that the genetic seed will only result in defective fruit given a suitable environment. Certainly, in the present state of our knowledge, it is impossible frequently to disentangle the two factors. It must be understood that "environment" here includes prenatal influences, when the condition of the parent determines the environment of the child; this would go some way to account for the prevalence of defect in the social problem group. In the Colchester investigation a systematic clinical and psychological examination of the patients, coupled with an inquiry into their family history, suggests that in 9 per cent. of the first 513 patients examined defect was due to environmental causes alone, in 29 per cent. it was due solely to heredity, while in 62 per cent. it was held to be conditioned by a combination of heredity and environment.

FERTILITY OF THE SUBNORMAL

We have seen that the carrier of defect is not usually a normal person. He is most frequently found in a group that is definitely subnormal. Add to this that like is attracted to like. The dull tend to marry the dull and defective, with the inevitable result that defect tends to be cornered and concentrated in this particular class of the community. That may not be altogether a bad thing, because it is easier to cope with defectives who are to be found in clusters and not indiscriminately scattered.

But there is another aspect of the problem that is serious. Whereas low-grade defectives are usually confined in institutions or under the care of their relatives, so that they are not free to marry and beget children, there is no such control exercised over the majority of the individuals who make up the social problem group. Nor have they sufficient intelligence, foresight, or self-control to set a limit themselves to the number of children they produce. The consequence is that the fertility of this subnormal class is much above the average fertility of the normal population.[1]

AN EXAMPLE FROM MR. LIDBETTER'S COLLECTION

A concrete example will serve better than further argument to point the moral. It is taken at random from the valuable collection of pedigrees recently issued by Mr. E. J. Lidbetter,[2] and it is undoubtedly typical of conditions with which social workers are painfully familiar, although the first generation of the families concerned is larger than the families one commonly meets to-day, even in this class. Only a part of the pedigree is reproduced and it is presented here in form somewhat different from the original, but using the author's own description where possible.

The story starts with two parents, presumably of poor mentality, for they were stated to be living in deplorable conditions and from time to time they were dependent upon public assistance. They had 15 children of whom 3 were stillborn, 5 died in infancy, 2 at four years, and 2 others under twenty. Of the remaining three, two were low-grade mental defectives, one being also an epileptic who died in the workhouse at thirty years of age. The other defective, a female (F.), married a feeble-minded man (M.), but before considering the offspring of this marriage it will be of interest to examine M.'s family history.

Here we begin with a man who was committed to prison for some minor offence and there died. His widow was on poor relief for several years. They had 14 children of whom 8 died in infancy and at least 3 were reared in poor-law schools. One of these three children, a girl of low mental order, cohabited for several years with, and subsequently married, a man who came to London from a small village in the Eastern counties. His mental state is not recorded, but one might infer from his choice of mate that his intelligence was not bright. They had 10 children of whom 5 were born before marriage. The family wandered about from place to place in East London, so that it is impossible to give a complete account of their drain on public funds, but the known and measurable periods of their chargeability to various boards of guardians amounted to nearly 10,000 days. Five of the woman's children are known to have been born in workhouses, the last of them nine years after her husband's death, and all who survived, six in number, were reared or maintained intermittently in poor-law schools. M. was one of these six children.

It seems almost criminal that this mentally deficient couple, M. and F., each coming from a stock with such a deplorable record, should be permitted to unite in wedlock. Their first child, like his father, was born in a workhouse a month after the marriage. The father indeed had spent his life in poor-law institutions except for two periods, one of five years when he was in Dr. Barnardo's Homes, and one of four and a half years when he was in the Army Labour Corps. Only for very short intervals during the later years of the record did he and his wife leave the workhouse, but their brief freedom sufficed for them to bring six children into the world. Two of the children survived and these were reared in poor-law schools. Latterly it appears that the relationship of the couple became somewhat casual: the woman disappeared but she was known to be living an immoral and uncertain life in the common lodging-houses of East London.

A PROBLEM TO BE TACKLED AT ITS SOURCE

In this example there is no evidence of organic disease. We have simply a combination of poor mentality, high fertility, and sordid conditions. It is a weak policy simply to avert our eyes from the degradation of human life and waste of public money that such conditions imply. Sooner or later the problem will have to be tackled at its source. Means must be found of discouraging from parenthood persons of the social problem type, who are more than likely to give birth to children of feeble if not defective intelligence, to be a constant drag upon the community in their turn.

The proposal of the Brock Committee that voluntary sterilisation should be permitted to any parent who has produced a defective child is one that should commend itself to all as a step, though only a small step, in the right direction.

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[1] See "Differential Class Fertility," by D. Caradog Jones (Eugenics Review, 1932, xxiv., 175). Other evidence is contained in the full report of the Social Survey of Merseyside. May, 1934. Liverpool University Press. 3 vols. £2 5s.

[2] "Heredity and the Social Problem Group." London: Edward Arnold and Co. 1933.

THE LANCET

LONDON: SATURDAY, MAY 19, 1934

CENTENARY OF THE LIVERPOOL SCHOOL OF MEDICINE

It was in 1834 that a grand old band of workers organised systematic lectures, covering eight medical and premedical subjects, in rooms belonging to the Liverpool Royal Institution; and to celebrate the foundation of this school of medicine just a hundred years ago, Prof. John Hay delivered an oration on Friday last in St. George's Hall, where the first infirmary once stood. The school from its start was coloured by its proximity to a famous port. An Act of George III. required every ship in the African trade (at that time mostly in slaves) to carry a surgeon qualified at Surgeons' Hall or by examination at a county hospital, and the infirmary had risen to the occasion by examining candidates at its monthly board meeting and passing nearly five hundred young surgeons into this service between the years 1789 and 1807.[1] Facilities for medical education at the beginning of last century were limited to schools attached to four London hospitals, no body of teachers outside the metropolis being permitted to grant degrees; nor did their lectures entitle students to enter for the examination of the Society of Apothecaries, until in 1821 this barrier against provincial teaching was broken down in Manchester, Liverpool soon following suit. At that time Liverpool was, it is said, the only town of any pre-eminence in England without one single erection or endowment for the advancement of science, and there was a chasm between the money-makers and a population of 100,000 workers packed more densely than anywhere else in Great Britain.

William Roscoe gave the lead to the select band of medical men who were not content to be absorbed in this nautical vortex. The turn of the century saw the foundation of the Athenæum, the Literary and Philosophical Society, and the Liverpool Medical Library; in 1817 was founded the Royal Institution which had among its aims that of providing lectures on chemistry, botany, anatomy, surgery, and medicine. There were not lacking other local names of outstanding merit, for it was Matthew Dobson who, in 1774, first demonstrated the presence of sugar in diabetic urine, and his colleague, Henry Park, was a pioneer in surgery of the joints. Things were made easier for medical study by the passing in 1832 of the Anatomy Act, providing an adequate supply of bodies for dissection, but not much progress was made until 1844 when the medical school was transferred from the Royal Institution to buildings erected by public subscription near the infirmary on its new site in Brownlow-street. Here the two grew up together, the school enjoying the protecting care of the infirmary. It remained, however, without endowed chairs, one faculty only with lecturers in science, until in 1874 the new regulations of the University of London compelled the council to extend its teaching of science, and this led to the establishment of University College. The sequence of events was quite different in the two great Lancashire towns. Whereas Owens College, Manchester, founded in 1851, had no faculty of medicine until 1873 when it became incorporated with the school of medicine, in Liverpool the development was in the reverse order; it was the lecturers of the medical school who took the initiative in the formation of University College, and it was the medical school of the Royal Infirmary which formed the core of the university. For many years the faculty of medicine was the most active and progressive of all the faculties. The first chair to be endowed was that of physics, first occupied by Sir Oliver Lodge, and other endowed chairs were held by such men as Campbell Brown, Herdman, Gotch, Paterson, Boyce, Sherrington, Benjamin Moore, and Ronald Ross. To match these giants on the academic side Liverpool was equally fortunate in having such clinicians as T. R. Glynn, R. Caton, W. M. Banks, F. T. Paul, W. Carter, Wm. Alexander, Rushton Parker, James Barr, and Robert Jones.

In other directions the presence of the port exerted a profound influence over the development of medicine in Liverpool, for in 1898 through the enthusiasm and foresight of Sir Alfred Jones, fortified by Sir Rubert Boyce, was founded there the first school of tropical medicine in the world. This school received its charter in 1905 with seats on the faculty of medicine. At that time there was scarcely any systematic investigation of tropical disease, the ground was almost virgin soil, and on the very first expedition Major Ross cabled from Sierra Leone on August 17th, 1899, to say that the malarial mosquito had been discovered. Next year, Dr. Annette, in Nigeria, proved the transmission of the parasite of elephantiasis by another mosquito, and up to 1914 no less than 32 expeditions were sent out to the tropics to study disease and sanitation. Another chair of which Liverpool is justifiably proud, that of biochemistry, the first in the British Isles, was created for Benjamin Moore, not only brilliant as a biochemist but possessing an infective enthusiasm. It was in his department that the *Biochemical Journal* saw the light. But the Liverpool school is not content to rest on its laurels. Disease, said Prof. Hay, is for ever taking new forms in changing conditions of life and society; the price of victory is eternal vigilance, the best defence is vigorous attack. Now is the time to strengthen the research activities of the clinical chairs and to found yet another chair in clinical science. And no doubt that will be done.

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[1] Many interesting details are given in "A Brief Record of the Liverpool Medical School, 1834–1934," by Arthur A. *Gemmell, M.D.* (Liverpool: The University Press. Pp. 22. 1s.), based on a vice-presidential address given to the Liverpool Medical Students' Debating Society on Jan. 18th last.

THE PROMOTION OF UTERINE CONTRACTIONS

WITHIN recent years a score of papers have been published by German, French, British, and American workers concerning the mechanical recording of the contractions of the human uterus. Three devices have been used—namely, an adaptation of the electrocardiograph, secondly, an apparatus recording changes in the shape of the abdominal wall consequent on uterine contractions, and thirdly, an intra-uterine bag connected to a recording manometer. The first method has been tried by German workers but has not yielded very useful results. The second in various forms has given some useful information, while the third, obviously the most direct, has given reliable and consistent results although at the expense of discomfort, and possibly some risk, to the patient. The most recent contributions to this subject are those by F. L. ADAIR and M. E. DAVIS [1] from Chicago, and by CHASSAR MOIR [2] from this country.

The communication by the American workers appears to be an interim report on the results obtained in the limited number of cases so far examined. The experiments, in which an intra-uterine bag was used, fall into three groups: (1) those made before or during labour; (2) those made in the immediate post-partum period, and (3) those made in the later puerperium. In groups 1 and 3 the methods used were similar to those which have been described by BOURNE and BURN, and by MOIR in this country, and more generous acknowledgment might appropriately have been made to these workers; in group 2 the observations were made immediately after a low segment Cæsarean section, a hydrostatic bag having been inserted into the upper uterine segment during the operation and the attached tubing brought out through the vagina. Under these conditions the upper uterine segment was always active and would respond to oxytocic drugs, while the lower segment (into which the intra-uterine bag could be pulled) was inactive and non-responsive. This corroborates the views usually held regarding the functions of those two portions of the uterus. MOIR, on the other hand, records different results from somewhat similar experiments performed late in the puerperium. He introduced a double bag into the uterus on the seventh day of the puerperium, one portion lying in the body of the uterus and the other in the reconstituted cervical canal. It was found that contractions were recorded by both bags; in some cases these were coördinated, the cervical canal contracting about 17 seconds after the fundus and thus suggesting a peristaltic action of the uterus.

ADAIR and DAVIS, the Chicago workers, have been chiefly concerned with the action of pituitary extracts, and of drugs on the uterus before and after delivery. They are not enthusiastic about the various ergot preparations, since the records so far obtained suggest that their effects are very inconstant. Ergotamine in the form of Gynergen (better known in this country as Femergin) yielded no result when given by injection. These observations do not correspond with those of MOIR,[3] who found that contractions could be constantly recorded after injection of ergotamine or ergotoxine, and also after oral administration of B.P. liquid extract of ergot. He has recently confirmed these results,[2] and states that whereas the ergot alkaloids take half an hour or more to act after injection, liquid extract of ergot acts within a few minutes of administration by mouth. This effect is presumably due to an unidentified active principle which is present in crude ergot preparations. The action of histamine is also discussed in both papers. This substance has hitherto been held to enhance the action of the ergot alkaloids, and to be a useful addition to such drugs; BOURNE and BURN obtained tracings showing that histamine has a quick oxytocic effect on the parturient uterus. According to the present workers this is true of large doses only, as far as the puerperal uterus is concerned; when quantities small enough to avoid serious vaso-motor disturbances are given (2 mg. of acid phosphate or less), the uterine action is negligible. Quinine, too, has given no certain evidence of oxytocic power on the parturient or puerperal uterus—an observation previously made by S. M. DODEK,[4] and by MOIR. Clinicians will probably feel that a fuller investigation should be made before these negative findings are accepted.

Perhaps the most interesting aspect of the work at Chicago concerns the action of the separated oxytocic and vaso-pressor principles of the posterior pituitary gland. It was found that for intravenous injection during pregnancy or in the puerperium, pituitrin, pitocin, and pitressin were equally effective. This is a remarkable observation, contrary to the findings of BOURNE and BURN [5] in their work on the uterus at term. Some variation of technique such as the use of intravenous instead of the more usual intramuscular injection may possibly account for the discrepancy in results. Unfortunately the information given by ADAIR and DAVIS on many essential details is disappointingly vague. For example, in several places the dosage of a solid substance is expressed in fluid measure without a note of the strength of the solution used; pituitary extracts are measured in minims without reference to the number of international units in the dose; and there is no indication whether the dosage of histamine is recorded in terms of the relatively heavy acid phosphate, or of the pure substance. This lack of precision makes it rather difficult to ascertain to what extent their results conflict with those obtained elsewhere. Other significant observations have, however, been made concerning the uterine action of the pituitary extracts. ROBSON,[6] working with muscle strips obtained from the human uterus at various stages of gestation, has shown that there are three stages of reactivity: (1) an early period when the uterus s non-reactive to both oxytocin and to vasopressin; (2) an intermediate period when the uterus reacts to vasopressin but not to oxytocin; (3) a late period when the uterus is highly reactive to oxytocin. DATNOW and JEFFCOATE have obtained somewhat similar results. Meanwhile, MOIR, using a new apparatus for recording clinically the contractions of the human non-pregnant uterus, reports[2] that there is no response to an intramuscular injection of 10 units of oxytocin, whereas a well-marked uterine spasm follows injection of 10 units of vasopressin. It is clear that the uterine action of these extracts is far more variable than their names would lead one to expect; the nature of the response appears to depend on the biological state of the organ at the time when the extracts are administered.

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[1] Amer. Jour. Obst. and Gyn., March, 1934, p. 383.

[2] THE LANCET, 1934, April 7th, p. 739.

[3] Brit. Med. Jour., 1932, i., 1119.

[4] Surg., Gyn., and Obst., 1932, iv., 45.

[5] THE LANCET, 1928, ii., 694.

[6] Recent Advances in Sex and Reproductive Physiology 1934: London: J. and A. Churchill, p. 189.

Pursuing further the study of the non-pregnant uterus MOIR has shown that the muscular activity varies with the stage of the menstrual cycle—the contractions, slight at first, becoming increasingly powerful towards the end of the cycle, and reaching a maximum in strength and frequency during menstruation. Hitherto gynæcologists have been chiefly interested in the cyclical changes in the structure and function of the uterine endometrium. It would now appear that a regular variation of activity takes place also in the uterine muscle. Such observations have an obvious bearing on the problems of dysmenorrhœa.

THE PROFESSIONAL MIND

LORD MACMILLAN, one of the happiest of our public orators, delivered this week the annual Maudsley lecture of the Royal Medico-Psychological Association. He chose for his subject the Professional Mind and discussed it not only to the evident enjoyment of his hearers but also to the prospective profit of a wider circle. Nobody will deny that the choice and practice of a profession visibly mould the mental outlook of men and women. In the process their habits are controlled, their thoughts are canalised, and their prejudices are developed; the very district of their activities, be it the neighbourhood of Cavendish-square or Chancery-lane, is determined by their vocation. Those who practise a particular art are drawn apart; they constitute a separate fraternity. In professional life, as in other kinds of life, there are elements good and not so good. There is material for praise wherein we may complacently take pride; but we must not expect even the most discreet and courteous of candid friends to be blind to our shortcomings and to have nothing to tell us to our advantage. Immersion in a profession has its risks. One of them, Lord MACMILLAN warns us, is the inevitable tendency to resist all change. Having painfully mastered a system, we are disinclined to scrap what we have found to work well enough. It is not easy to make the effort to examine new ideas which may prove uncomfortably subversive. A century ago, we are told, the Admiralty felt it to be its duty to discourage the introduction of steam as calculated to strike a fatal blow at the naval supremacy of the Empire. Has the history of medicine no instances of a similar conservatism? Another danger of the professional outlook is the proneness to prefer the interests of the craft to the interests of the community. ADAM SMITH indeed looked with profound suspicion upon professional and trading corporations. "People of the same trade," he observed, "seldom meet together even for merriment and diversion, but the conversation ends in a conspiracy against the public or in some contrivance to raise prices." Citing this gloomy comment by his great compatriot, Lord MACMILLAN wonders what SMITH would have thought of the innumerable congresses and conferences nowadays held by every trade and calling. "I am afraid," he adds, "he would often find in a perusal of their proceedings little to dispel the truth of his indictment." Yet the community never needed the expert so much as now. In the planning of industry, whether it be coal-mining or agriculture, in the coördination of facilities, whether it be water-supply or London transport, there is a demand for the expert to be put in charge. The experts are not, however, unanimous, nor are they infallible. The faith of the public in political economists, for example, has, as Lord MACMILLAN says, been rudely shaken by the discordant advice which they have tendered since the war for the treatment of the ailments of the body politic. Post-war or pre-war, the Adam Smiths no longer have things all their own way.

To the professions of medicine and of law, producing perhaps a comparable type of mind, Lord MACMILLAN devoted special attention. The lawyers, he confesses, are sometimes accused of sacrificing conscience to advocacy, of thriving in an atmosphere of forensic red herrings and of overworking their faculty of making the worse appear the better reason. While not blind to the elements of truth in the popular caricature, he still can claim with confidence that the practice of the law has no deteriorating effect on the moral character. The great bulk of the legal work of the country, he says, is non-contentious; it requires for its successful performance no perverse intellectual subtlety but simply the ordinary workaday virtues of industry and honesty. Lawyers, he admits, tend to be preoccupied with words, to worship a formula, to value an argument not so much for its essential soundness as for its convenience of statement. They tend too to cynicism and to criticism of a merely destructive sort. "This critical habit is a useful quality in its proper place but it often handicaps the lawyer in dealing with constructive proposals where success can be attained only by disregarding risks. And so lawyers are not temperamentally well-fitted for leadership either in politics or in business, in both of which spheres an adventurous spirit is essential; they may be admirable in deliberation, they are not so useful in action." If the lecturer discreetly refrained from naming twentieth century examples, some of his hearers probably allowed themselves a greater licence in secret. An audience of doctors indeed might make bold to remember that, while the post-war period has piled up special difficulties for the Ministries of Health and Agriculture, two of the most vigorous and constructive of our political leaders have been members of the medical profession.

Turning to a study of the doctors, Lord MACMILLAN acknowledged that their relations with their patients reveal an intimacy which no other profession attains, and that diagnosis requires not only knowledge but also reasoning power and imagination. Personality, again, counts for much in medical practice; the mere presence of the trusted medical adviser inspires confidence and has its own therapeutic value. The exacting nature of the work, the irregular hours, and the frequent interruptions of ordinary social life are other forces which, making their demand upon the whole physical, mental, and emotional resources of the doctor, create a special type of character. The type, Lord MACMILLAN reminded his audience, is exemplified in the highest degree in those who are called to minister to minds diseased—a region of practice where psychological factors necessarily predominate. What is that type, or rather perhaps what should it be? The lecturer made no attempt to preach a lay sermon on medical ethics. He merely gave us for the moment the gift to see ourselves as others see us. Despite his continual contact with suffering, the doctor, as Lord MACMILLAN sees him, is not callous. He must acquire a certain calmness in the presence of life's emergencies and tragedies which is not to be mistaken for unconcern. Despite the confidence reposed in him, he will resist the temptation to be professionally oracular. Despite his habit of setting out prescriptions in hieroglyphics, he will remember to avoid the obscurantism of spells and incantations. Foibles can be laid to the charge of his vocation; they are to be outweighed by the unselfishness and devotion to duty which Lord MACMILLAN generously describes as the very hall-mark of the medical profession. "It is perhaps in the medical man," he concluded, "that the professional mind finds its finest flower." Though we may feel the praise to be too charitable, we can thank him warmly for a stimulating re-statement of the ideal.

ANNOTATIONS

ROYAL SOCIETY CONVERSAZIONE

THERE were 51 exhibits at Burlington House on the evening of May 9th illustrating, it is said, the most recent advances in pure and applied science, but affording a still better illustration of the fact that the exhibitor may be of as much interest as the exhibit. It is one of the attractions of the evening that those who explain the advances have contributed in large measure to the advance. There were, it is true, only two exhibits bearing directly on medical practice, although few, if any, had not some indirect relation to it. Exhibit 15 consisted of bed bugs to illustrate the possibility of their control by fumigation when furniture is in transit from old slums to new estates. Exhibit 31 was a model of the simple apparatus for artificial respiration which kept a patient alive for two years in the account given in our own columns on April 14th, p. 786. The physiologist had an opportunity of seeing a successful attempt to keep electric responses from a nerve constant during stimulation by condenser discharges; he could follow the detection of acetylcholine by its action in extremely low concentration on different kinds of isolated muscle. The pathologist was shown the coccoid organism responsible for psittacosis and the cytoplasmic inclusions seen in other virus diseases such as canary pox and dog distemper. A demonstration was given on a microscope for ultra-violet photography in which the optical parts must be standardised with such care that they are interchangeable. Those with a historical turn were shown the first telescope with an erecting eye-piece made by Maria de Rheite and dated 1646; the magnification is about 21 and the telescope is in its original condition and still perfect. They were also told the story of the automatic microtome devised by undergraduates at Cambridge in 1882 and still the basis of the famous "rocker." Geneticists could see a remarkable race of oat plants having 41 instead of the normal 42 chromosomes, producing progeny 88 per cent. albino and incapable of living more than a few weeks; also how irradiation might produce breakage and fusion of chromosomes in locusts, resulting in many-tailed sperms. The physicist was shown the apparatus for photographing a lightning flash no matter what its speed, and the means for determining the length of the metre and the yard in terms of wave-lengths of light. And finally all who go down to the sea were gladdened by an exhibit by the Admiralty Chemical Service of a means for salvaging waste oil and so avoiding the terrible mortality of marine birds. Altogether it was an exhibition to stimulate the imagination.

OPERATION IN PNEUMOCOCCAL PERITONITIS

No final answer has yet been given to the question whether or not operation is the best treatment for cases of pneumococcal peritonitis. Against surgical intervention it has been argued that it is not only dangerous and characterised by a high post-operative mortality, but is also useless because it is not possible to remove the cause of the infection. MM. Loutsch and Mérigot have recently challenged [1] the basis of these arguments, although they admit that the main reason for operative treatment is the extreme difficulty, often amounting to impossibility, of deciding between peritonitis due to appendicitis and pneumococcal peritonitis. This is where the argument is apt to end in practice. Loutsch and Mérigot have been at some pains to analyse the signs and symptoms of pneumococcal peritonitis in ten cases which have come under their care in the Hôpital Trousseau. No sign or symptom was found which proved of any constant value. Herpes of the mouth was an important sign when present, as was vulvitis. Diarrhœa they do not consider pathognomonic, although it was present in several cases. Generalised abdominal pain is not of much value, as quite often the maximum pain was referred to the right iliac fossa, and there was no sign elicited by examination that was of any particular assistance. The most characteristic finding in these ten cases seems to have been the profound illness of the children. Every case has some such observation as "general condition grave," "cyanosis," "respiration quick," and the pulse-rate varied between 120–150. One characteristic sign, not mentioned by these authors, but which may prove of great value in diagnosis is the grunting nature of the respirations. This is apparently a sign of pneumococcal septicæmia, as it is present in pneumonia, as well as in pneumococcal peritonitis. But if it is hard to determine whether operation will do any good, Loutsch and Mérigot find no reason to suppose that it influences the prognosis for the worse. The mortality is admittedly high (they give it as 30–50 per cent.), but this they consider is attributable to the nature of the disease. Their observations on the course of the illness have led them to recognise a critical period between the 10th–15th days, and, in common with other observers, they distinguish a type of case in which peritonitis is but one of several manifestations of a generalised disease. These cases have a very serious prognosis. Answering the contention that operation (by which they really mean drainage of the peritoneal cavity) is useless, they quote observations of their own to show that improvement in general condition followed free evacuation of pus. To say that operation is futile if one does not remove the source of the infection is no more valid here than in many other diseases in which drainage is of proved value. Even before pus has formed they advocate peritoneal drainage, for pus may drain away later. With the more vital objection that so-called drainage of the peritoneal cavity drains only a small cavity around the tube, they do not deal, nor do they consider the view that late drainage of pus may be due to secondary infection of the depths of the wound from outside. The question resolves itself, as it always does, into whether it is possible to exclude acute appendicitis, and whether, in operating to settle the diagnosis, we are prejudicing the chances of recovery in the case of pneumococcal peritonitis. Loutsch and Mérigot would operate.

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[1] Presse Méd., March 31st, p. 517

EPIDEMIC VERTIGO

Dr. Stefan Vatev, who holds the chair of pædiatrics at Sofia, has recently described[1] epidemic vertigo as he has seen it himself in Bulgaria, and his account confirms in its main features that given in our correspondence columns a few months ago by Dr. Otto Leyton.[2] In the autumn of 1929 Dr. Vatev began to see cases of a peculiar disturbance of consciousness, best covered, he thought, by the term vertigo, attended with a characteristic group of accompanying symptoms. The onset was sudden, the duration several days or weeks, the victims as a rule being able to go about their work the whole time. In three years he saw 146 such cases—62 males, 84 females, at all ages—without predilection for occupation, although six doctors were among the number. As a typical example he tells of a doctor, aged 65, who in February, 1930, became suddenly aware of giddiness on moving his head when recumbent. The giddiness was accompanied by a feeling of heaviness in the stomach and twice he vomited before rising in the morning. He was apt to feel giddy on rising from his seat or on bending his neck to auscultate; he had occasional palpitation with no alteration of blood pressure; he complained now and then of headache, especially in the forehead, was troubled with polyuria chiefly at night, with no qualitative alteration in the urine. The attacks lasted three months and then disappeared, along with the cardiac irregularity; four months later he had left-sided hemianopia lasting a month. He tried all kinds of drugs without appreciable effect, except that aspirin relieved the nocturnal polyuria. In this doctor's household his mother-in-law had similar but slighter symptoms lasting a fortnight in May, 1930, repeated again in November. His 20-year-old daughter had slight vertigo, pain in the neck, heaviness in the stomach, and nausea, the symptoms only present on getting up in the morning and lasting two months. In October the doctor's wife had attacks of vertigo when recumbent at night, accompanied by radiating pains over the heart. Two sons of 22 and 27 were the only members of the household who escaped. The other cases were of much the same character, often occurring in groups; the vertigo mostly coming on at night or at all events in the recumbent position, and rarely preventing the subject getting about. In a few cases there was complaint of definite loss of consciousness not lasting more than a few seconds but giving rise to a feeling of insecurity. Headache was frequent but only severe in nine cases of which a few had hemicrania. Some patients complained of muscular cramp during sleep, others of myalgia. Dr. Vatev remarks that a rise of temperature had no effect on the severity or the frequency of the vertigo; even when influenza was prevalent in the spring of 1931 the cases of vertigo kept on occurring without relation to it. In no case did the attack leave any sequel. Diminished patellar reflexes were noticed in some cases. Both epilepsy and hysteria could be definitely excluded. The occurrence of the disease in groups led Dr. Vatev to regard it as an infection with a specific neurotropic virus, but as to where it enters the body and how it produces its effect he ventures no opinion except that the probable port of entry is the nose and throat.

THE MICROSCOPY OF VIRUSES

THERE is abundant evidence that the larger filtrable viruses can be seen with the microscope. Recent work with vaccinia, fowl-pox, psittacosis, and ectromelia fully justifies such a statement. Not only can formed elements be seen in stained preparations of virulent material, but these virus particles can be freed from extraneous material by differential centrifugation or ultrafiltration and shown to be both virulent and susceptible of specific agglutination. Only the ultraphilosophic remain reluctant to abandon the possibility of these particles being merely the inert carriers of an unorganised virus, and their attitude is hard to understand, particularly when one recalls that Barnard's findings with ultra-violet dark-ground microscopy have shown the particles to have definite structure.

This line of virus research it now being actively pursued in Japan, and in two recent papers[1,2] Taniguchi and his associates describe new methods of staining and the fruits of their application to the study of the viruses of vaccinia, fowl-pox, molluscum contagiosum, varicella, herpes simplex, and zoster. So far, however, it cannot be said that the work substantially advances our knowledge; even the method of staining, which depends on mordanting with an acid dye like eosin, has already been suggested by Craigie.[3] Moreover, some of the conclusions arrived at in the first paper are open to question. The virus of varicella was studied in rabbits—a species whose susceptibility to this virus has never been established—so that the conclusions that it multiplies in the cytoplasm of infected cells can only be accepted with caution. The statement, too, that the viruses of fowl-pox and molluscum multiply preferably in the nucleus is almost certainly incorrect; even two out of three of the authors' illustrations, viz., Fig. 3, of cells infected with fowl-pox virus show the inclusion in the cytoplasm, while the third is so indefinite as to leave one in doubt as to whether one is dealing with a virus inclusion or not. The second paper is devoted to the viruses of herpes simplex and zoster. Here again there is evidence of unfamiliarity with published work. The claim to priority in the discovery of zoster elementary bodies ignores the fact that Paschen[4] has described and figured these bodies, and the estimate of 0·25 μ for the size of herpes simplex is not in keeping with the work of Bedson [5] and Elford, Perdrau, and Smith [6] to which no reference is made. It is unfortunate that the enthusiasm of the Japanese investigators should not have been tempered by fuller knowledge of what has been done elsewhere.

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[1] Deut. med. Woch., Feb. 2nd, p. 167.

[2] THE LANCET, 1933, ii., 1932, and Jan. 13th, p. 107.

[1] Taniguchi, T., Hosokawa, M., Kuga, S., and Fugino, T.: Japan Jour. Exp. Med., 1934, xii., 91.

[2] Taniguchi, Hosokawa, Kuga, and Masuda, Z.: Ibid., 1934, xii., 101.

[3] Craigie, J.: Jour. Path. and Bact., 1933, xxxvi., 185.

THE R.I.P.H. AT NORWICH

THE annual conference of the Royal Institute of Public Health, held under ideal conditions at Norwich during the present week, was opened by a remarkable address from the President, ex-Lord Mayor Henry M. Holmes, on the conditions of employment in that city over a period of six hundred years. Norwich rose to prosperity when Edward III. and his Queen brought Flemish weavers to initiate the trade in wool and worsted, which remained the staple industry until the machine loom in the industrial north spoiled the market for handmade goods, when even the weavers themselves could not afford to buy their own produce. In the sixteenth century Flemish refugees introduced the dyeing and printing of fabrics along with new forms of weaving, and prosperity was accompanied by a high sense of social hygiene, for the city had a piped supply of water to the market as well as to private houses and it is recorded that the streets were so well kept that they maintained the health of the citizens and won the praise of strangers. Still in the eighteenth century Norwich was without a rival in the art of dyeing, and worsted fabrics were sent there from all parts of the country to be dyed and finished. Even children from six to ten years "gained twelve thousand pounds more than what they spend and that chiefly by knitting fine jersey stockins"; every weaver too had a goose for his Sunday dinner. When industrial prosperity declined in the early nineteenth century the public health also ebbed; streets were badly paved and lighted, with an almost complete lack of drainage, courts were the dumping ground for refuse, and in the worst neighbourhoods there was little water as the tenants could not, and the landlords would not, pay for it. Later in the century the familiar tenacity of Norwich folk reasserted itself and the making of boots and shoes again brought prosperity to the city, which even dictated the fashion in light shoes. Edible and household commodities of all kinds were manufactured at Carrow, and Norwich became emphatically a town of mixed industry, although maintaining some of the characteristics of a mediæval city. At the conclusion of his address Mr. Holmes gave illustrations of the high degree of social welfare among the present-day workers, of a vast scheme of municipal housing, and of the development of public services by which, in the words of a handbook recently issued for tenants on the housing estates, "the ratepayer can be born in a municipal maternity home, cared for in a creche, and be educated, doctored and generally reared in a public elementary school, supported during his manhood in time of need, and buried in a public cemetery." The conference was honoured by the presence of Sir Charles Sherrington, who was awarded the Harben gold medal for distinguished service in physiology.

"OCCUPATION AND HEALTH"

THE final number has just been issued by the International Labour Office at Geneva of the English edition of the valuable encyclopædia, entitled Occupation and Health,[1] which has been appearing in brochure form at irregular intervals for the past ten or twelve years. The completed work consists of 353 articles, each contributed by an expert of international standing. It appears in English and French editions; as the articles were written originally by the authors in their own languages, often using terminology peculiar to some unique trade process, the task of translating such highly technical descriptions, together with pathological findings, has called for expert translators who have carried out their difficult work with great care. For example, only familiarity with the intricacies of metal smelting and with recent studies of pulmonary pathology could have enabled the last article in the series which deals with zinc to be successfully translated. The plan of the book is this. In each instance industrial usage and processes are described with explanations of exposures to hazards, whether from some toxic agent or bodily strain; then follow sickness records and pathological descriptions with preventive measures and treatment, concluding with legislation. Some idea of the scope of the whole may be gathered from the subjects covered in this last brochure: transport industry, tripe and gut works, tungsten, turpentine, uranium, vanadium, varnishes and lacquers, welfare workers, wine and spirit industry, xylene, zinc. In 36 pages are considered the risks of transport, whether by rail, tramway, or load carrying; information has been gathered from Italy, Australia, U.S.A., Great Britain, Russia, France, Switzerland, Germany, Japan, Argentine, and Chili. The value of such a work for reference needs no emphasis.

DEFENCE AGAINST STAPHYLOCOCCI

THE paper by Dr. Parish and his colleagues on another page of this issue draws attention once more to the properties of staphylococcal toxin and toxoid. It is shown that in laboratory animals injection of these substances will increase the amount of antitoxin in the serum, and that the presence of this antitoxin is of real value in combating infection with the living staphylococcus. It is also shown that the use of toxoid in man leads to an increase in the amount of circulating antitoxin; the clinical results, however, are left somewhat vague. It is unfortunately true that, although many accounts of such treatment have been published in the last few years, its value is still uncertain. This is evident, for example, from two reports which have appeared in the last few weeks. In the first, D. J. Kindel and M. J. Costello [2] describe the effects of treating a mixed series of skin infections with toxoid; more than half of the cases were diagnosed as acne vulgaris and the results were naturally disappointing. In the second, J. A. Gilchrist and Mary J. Wilson[3] associate the incidence of diabetes mellitus with staphylococcal infection, particularly of the nasal sinuses, in many of their patients, and record cases in which treatment with toxoid has enabled them to dispense with the use of insulin.

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[4] Paschen, E.: Zentralbl. f. Bakt., 1933 (Orig.), cxxx., 190.

[5] Bedson, S. P.: Brit. Jour. Exp. Path., 1927, viii., 470.

[6] Elford, W. J., Perdrau, J. R., and Smith, W.: Jour. Path. and Bact., 1933, xxxvi., 49.

[1] Encyclopædia of Hygiene, Pathology, and Social Welfare. Geneva: International Labour Office. (London office, 12, Victoria-street, S.W.1.) Complete in two volumes, paper £3 3*s*., cloth £3 10*s*.

[2] Jour. Amer. Med. Assoc., April 21st, 1934, p. 1288.

In view of the misery caused by "trivial" but recurrent staphylococcal infection, and the potent effects in animals of modern preparations of toxin, the time seems to have come when a full investigation should be made into the effects of toxoid treatment in the various types of this infection. In such an investigation the use of a standard technique for the estimation of antitoxin, such as that quoted by Parish, O'Meara, and Clark, would probably be essential. Their paper is, however, open to criticism on a point which may be of real importance—namely, that it ignores the presence in toxin of a leucocidin capable of attacking human phagocytes. There is evidence suggesting that the production of leucocidin by different strains of cocci varies independently of the production of hæmolysin and necrosing toxin, and that the former property runs parallel with the severity of the human lesion from which the strain was isolated, whereas the latter does not. If this is true, the toxoid used clinically ought to be prepared from toxin in which both factors are present.

THE CONTROL OF BODY TEMPERATURE

THE recent advent into therapeutics of artificial pyrexia brings into prominence the question of the normal control of body temperature. Although the principles of this are fairly well understood, it is probable that new lines of investigation will have to be explored before the implications of electro-pyrexia can be fully worked out. It is known that a steady temperature is maintained by an exact balance of heat production and heat loss, both of which seem to be under reflex control. It is convenient to regard heat as a by-product of muscular contraction; the contractile machine is not a perfect one, and mechanical energy can only be obtained from food at the expense of considerable wastage in the form of heat. During severe exercise the body must rid itself of this heat as best it can; an individual walking at five miles an hour may have to get rid of seven times as much heat as if seated. The body at rest is faced with a different problem, that of ensuring a degree of general muscular contraction sufficient to prevent its temperature from falling. This it does by adjusting the tone of the muscles; the "relaxing" qualities of warm air and the "bracing" effect of cold are commonplaces, while shivering may be regarded as an extreme form of involuntary muscular action called into play when simple increase of tone becomes insufficient. Of the significance of heat produced by the activity of other tissues we know little.

In heat loss by far the most important organ concerned is the skin, which is cooled partly by radiation and conduction, partly by evaporation. The former is controlled voluntarily by clothing, involuntarily by the amount of blood allowed to flow through the cutaneous vessels, and is naturally influenced by the temperature and movement of the surrounding air. The latter is controlled involuntarily by the activity of the sweat glands, and is profoundly affected by the humidity and movement of the atmosphere. Of the two, evaporation is more important during exercise and at high external temperatures; and radiation and conduction are more important at rest. Under normal conditions production and loss are balanced one against the other and may be called into play reciprocally. This dual control is important in relation to internal as well as external conditions. Far more fuel may be supplied to the body at one time than at another. If an excessive amount is taken as much as possible must be stored as carbohydrate and fat, and the surplus heat produced by the compulsory oxidation of the remainder (usually protein) eliminated via the skin. Conversely, insufficient fuel must be compensated by a call on stored food and even on the tissues themselves. All this is automatic, but a realisation of the underlying principles is important in arranging diet and clothing when there may be exposure to extreme climatic conditions; the tragic end of Scott's last antarctic expedition was due in part to the failure to realise the disproportionate amount of food needed to maintain body temperature over and above that required for strenuous work.

The balance of heat income and expenditure is clearly a matter of delicate reflex control, and it is not surprising that diurnal variations occur, nor that the body temperature rises during muscular exercise; it is in fact doubtful whether these are due to "failure" of control, or whether they serve some useful purpose. The menstrual fall of temperature in women, together with many animal experiments, points to the participation of the ductless glands in the process. A consideration of variations above and below the conventional "normal" temperature brings us to a further question. Once we have admitted that the balance between production and loss is not always machine-like and precise, we are forced to postulate some supreme entity which fixes the mean level and dictates how much ground must be ceded or regained at any given time in order to return to it. This function is attributed to a "temperature regulating centre" whose location is a matter of doubt; removal of parts of the brain in animals from above downwards indicates that it is higher than the mid-brain, and the corpus striatum has now given place to the hypothalamus as its most probable site. The reason why the mammalian temperature should have to be maintained about the level of 38° C. is a matter for speculation; in the course of the ages the sea must have passed this point in cooling to its present temperature, and its passage may represent a critical period in the history of warm-blooded animals.

The point of immediate interest is not, however, the normal temperature, but the limits which are compatible with life. From data given by F. Vlès[1] for a number of animal types, including some marine organisms, the commonest lethal temperature appears to lie between 38° C. and 45° C.; that of the dog, the only mammal mentioned, is 44°–45° C. which fits in with general experience in the human subject; yet some tropical animals have a normal temperature higher than this. In general animals have narrower limits than plants, and highly organised animals the narrowest of all. A list of common bacteria shows that these can withstand for a short time temperatures ranging from 54°–70° C., while some spore-forming varieties are not killed by temperatures well over 100° C. Dehydration (as in spore-formation) is shown by other examples to confer a great immunity to high temperatures. The *Treponema pallidum*, however, as previously noted in these columns[2] succumbs after exposure to 42° C. for one hour. The lower limits of temperature show a much wider variation; bacteria and seeds have been reduced to temperatures in the region of − 200° C. without being killed. For other plants about − 17° C. is fatal; for some fish and frogs about − 3° C.; for macaques + 14° C. and for man + 24° C. It should be emphasised that all these temperatures refer to actual tissues and not to the surrounding medium; the length of time for which they can be withstood is not given in all cases, but a sufficiently clear idea is obtained for comparative purposes. Vlès himself writes:—

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[3] Canad. Med. Assoc. Jour., April, 1934, p. 353.

[1] Roger and Binet: Traité de physiologie normale et pathologique. Paris: Masson et Cie. Pp. 895, et seq.

[2] THE LANCET, March 31st, p. 695.

> "It seems that the temperature of coagulation of the protoplasmic colloids determines the irreversible thermal limit; but in reality disturbances are manifested long before the temperature of gross coagulation of the isolated proteins is reached. A whole series of physico-chemical mechanisms is affected by a rise of temperature . . . electrolytic dissociation . . . viscosity . . . colloid equilibrium and permeability . . ."

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FOOD STANDARDS

THE British housewife, although she may not have much knowledge of the principles of nutrition, makes her purchases with considerable skill, having regard to the dietary, tastes, and customs of different parts of the country. This we have on the authority of a departmental committee on the composition and description of food which has just reported [1] to the departments of health. And her choice is no doubt made easier by the fact, duly noted in the report, that a large proportion of the food manufactured in this country reaches a high standard of quality. Nevertheless, the absence of definition does give rise to difficulties to consumers and administrators as well as to public analysts. The composition of certain articles of food is already regulated by law—e.g., spirits, flour, bread, butter, margarine, condensed and dried milks; and owing to this no doubt is the observation that the term butter has the same meaning in commerce to-day as it had fifty years ago, whereas toffee is no longer a sweetmeat prepared from butter and sugar—even if, as the committee suggests, purchasers are still getting what they want. The purchaser of cheese or cream gets articles with varying proportions of fat, for there is no statutory limit in either case. The position is vastly different in some of the Dominions where in South Africa, for instance, the number of food articles with exact legal definition and standard is about 50, and in Canada at least three times as great. The committee was asked to consider: "whether it is desirable that the law relating to the composition and description of articles of food should be altered so as to enable definitions or standards to be prescribed, or declarations of composition to be required, for articles of food other than liquid milk; and if so to recommend what alterations of the law are required."

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[1] Report of the Departmental Committee on the Composition and Description of Food. Cmd. 4564. H.M. Stationery Office. Pp. 18. 3*d*.

THE PREVENTIVE ASPECTS OF MEDICINE

A Series of Lectures in progress at King's College Hospital Medical School

XXII.—THE PREVENTION OF ACCIDENTS

THE constellation of causes producing those unexpected events called accidents is made up of two factors, material and personal, which vary greatly in their relative importance. At one extreme is an accident arising from a novel and therefore unforeseen defect in material; at the other is a mishap brought about by the eccentric behaviour of an individual, in circumstances where, except for that eccentricity, no accident could arise. As an example of the latter I was once shown a machine so efficiently guarded that I was challenged to introduce a finger into the working parts, yet was assured that a lad working at the machine had, by some extraordinary gymnastics, managed to get his hand seriously injured.

The material factors responsible for accidents have been officially recognised since the Factory Act of 1844, which was the starting point of statutory provisions for those mechanical protections of the worker which have now become so extensive that they form a subject of study by themselves. In addition there are numberless customs established by experience, such as, in our own little world, the counting of swabs at the close of an operation or holding a bottle by the neck when putting in the cork, the violation of which carries a risk. As a recent development, the "Safety First" Association seeks to inculcate, on a voluntary basis, the importance of behaviour in accident production.

The systematic study of accidents in their incidence and personal "causes" was begun towards the end of the late war under the direction of what is now the Industrial Health Research Board. This work was not concerned so much with mechanical safeguards—that aspect of the subject offered little new—as with the effect of occupational conditions upon the worker. Further, the important fact that a minority of workers are responsible for more than their proper share of accidents, if not actually a discovery of the Board's investigators, was first established by them upon a statistical basis. The phrase "accident proneness," now in world-wide use, was originally coined by Mr. Eric Farmer, whose investigations I shall describe later.

Occupational conditions affecting accident incidence were studied in 1917–18 by Osborne and Vernon. In their report they quote American figures showing a notable increase of accidents with increase of output, so disproportionate that a 5 per cent. increase in output caused a 20 per cent. increase in accidents; an excessive turnover in personnel, with an excessive number of inexperienced men as a consequence, threw doubt upon the validity of the figures which, at first sight, indicated a close relation between fatigue and accidents. It was shown, however, in our munition factories, that accident incidence in women bore a definite relation to the extent of working hours, and at the time this was ascribed to the influence of fatigue. Since then we have come to be cautious in the use of the conception of fatigue; fatigue in industry is not the simple phenomenon seen in a nerve-muscle preparation, but factors such as boredom, incentive to work, and opportunities for divided attention play a part in manifestations for which the easy diagnosis of fatigue is misleading.

We can, however, accept without further discussion that accidents are influenced by hours of work, speed of output, temperature, lighting, inexperience, and youth of the worker. These conditions affect the behaviour of the worker; their results may be specific to the individual but their existence is general.

A new approach to the problem was opened up by Greenwood and Woods, who published in 1919 an important statistical examination of the individual distribution of accidents.

The fact is easily established that when people are engaged upon a specific task and exposed to risk of accidents, especially so trivial as to allow the victim to continue at work, it is observed that some have no accidents, some have one, some two, and some more than two.

If these accidents were accidents in the strict sense: if each stood alone and the occurrence of one accident to an individual had no relation to his likelihood of having another, then the distribution described above would conform to the type of a pure chance distribution.

If, however, the occurrence of one accident altered the chance of the victim incurring another, just as one attack of a disease may lead to immunity or to increased sensitivity, the type of chance distribution would not fit. The distribution would be biased.

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It was readily shown that those people who had an accident in one period had more accidents in a second period than any chance distribution would give; those who were immune to accidents in the first period tended to be immune in the second. That is, the incidence of *first* accidents was not a chance distribution. Varying individual susceptibility to accidents is therefore an extremely important factor in determining the distribution. Further statistical work by Miss Newbold in 1926 confirmed this finding, the consistence of individual tendency to accident being shown by the association found between (1) accidents in two different periods, (2) accidents of one type and accidents of other types, and (3) accidents in the factory and accidents at home.

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In their investigations they used a battery of psychological tests and found that a group made up of the dotting test, reaction-time test, and pursuit-meter test (called æstheto-kinetic tests) yielded significant correlation coefficients between the scores and the accident rates. Ocular muscle-balance tests gave an interesting result. Hyperphoria was definitely related to an increased accident rate, whilst the percentage difference in accident rate between those with and those without eso- or exophoria was inconsistent: in one large group persons with these defects actually had a lower accident rate than those free from them. Intelligence tests produced results that had no relation to accident incidence, but tremor, though occurring in only a few cases, was, as might be expected, correlated therewith.

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[1] Report of the Departmental Committee on the Composition and Description of Food. Cmd. 4561. H.M. Stationery Office. Pp. 18. 3*d*.

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but heterophoria and these tests did not correlate between themselves. That is to say, they probably were measures of different qualities unrelated in themselves yet both concerned in the production of accidents. An important by-product of the investigation was the discovery that the æstheto-kinetic tests and the intelligence tests correlated positively with industrial proficiency, though they did not correlate with each other. Also none of the tests correlated with sickness incidence, although that correlated with accidents and industrial proficiency.

Detection of Psycho-Neurotic Symptoms

These tests are all objective and presumably independent of any personal bias of the observer. But the æstheto-kinetic group depend upon the behaviour of the subject; so do accidents, and we can express the results by saying that people who behave in a particular way at the tests will tend to behave at work in such a way as to produce accidents. This consideration provides a convenient link with a method of investigation which leads by another road to possibly similar results. Beginning with a research into telegraphists' cramp—which, according to modern views, is not to be regarded as a disorder of muscle or nerve but of behaviour, like a stammer—I have been led on to systematise a method of interviewing designed to elicit the presence of psychoneurotic symptoms among presumably healthy people. Everyone dealing with "nervous" patients develops his own method of eliciting what he regards as diagnostic information; questionnaires for the same end are to be found in the literature and they apparently find favour in the United States. As guides to a beginner in interviewing such questionnaires are useful, but when handed to the subject for written answers they seem to me quite inadequate. I recollect being given, when a student, a book of instruction in case-taking which was practically a questionnaire for my guidance; to hand the book to the patient and invite his answers did not enter my mind or that of my teachers. A knowledge of disease and symptomatology was necessary in order to follow up the clues given by the patient, and in the same way an interviewer seeking for "nervous" symptoms or temperamental qualities must know what to look for and how to look for it.

I have now used and taught the method of personal interview sufficiently to be sure that the results are consistent and reliable, whether the work is done by myself or a trained assistant. As a check upon my findings, however, I used the McDougall-Schuster dotting machine, which was also included by Farmer and Chambers in their tests. I classified my interview results numerically, and statistical methods showed that a high incidence of nervous difficulties correlated with a poor dotting record.[1]

About 20 per cent. of the working population studied by me suffered from nervous symptoms which, in my judgment, interfered with happiness and efficiency; they also did, on the whole, a bad dotting test. Farmer and Chambers found that about 20 per cent. of their working population had a high accident incidence and did, on the whole, a bad dotting test. It is not practicable to stage another investigation to test the identity of their 20 per cent. and mine, but if we assume their identity—or a high correlation between them—then we have gone a step farther and may hope sometimes to find an answer to the question why a particular individual is prone to accidents. Farmer and Chambers point out that "the correlation coefficients between the tests and accident rates were for the most part small, this suggesting that accident proneness is dependent upon many dominant factors and not on a single predominant one, and affording no evidence that the tests measure the most important of these. This can only be determined by further experiment." The practical value of the tests is suggested by the fact that in the æstheto-kinetic group the accident rate of the worst 25 per cent. was about two and a half times as great as that of the remaining 75 per cent. Their applicability in eliminating the accident-prone is obvious, and would, I think, be increased by the addition of the personal interview.

It is to be noted that the tests themselves bore no relation to the occupation of the subjects, who were apprentices in the workshops of Naval and Royal Air Force establishments. Any large group of workers whose conditions were sufficiently uniform to provide statistically reliable material would have served equally well.

The investigators refrained, in the case of æstheto-kinetic tests, from making any claims as to what qualities they were testing. The McDougall-Schuster dotting machine was designed as a test of sustained voluntary attention but is cross-cut by other factors. In the hands of McDougall and May Smith it proved useful as an indicator of the results of loss of sleep or the administration of certain drugs, but only when the normal test-result of the subject was established. May Smith and myself found that its results correlated with the presence and degree of psychoneurotic symptoms. But *what* it measures we do not venture to say; nor do Farmer and Chambers.

Tests for Motor Drivers

Quite a different principle is claimed for tests now coming into use for the purpose of eliminating unsuitable men from those proposed for training as motor drivers. The National Institute of Industrial Psychology has devised a series of tests for the purpose of directly measuring certain qualities regarded as essential to safe and efficient motor driving. Reaction time, resistance to distraction, vigilance, judgment of speed, judgment of spatial relationships, confidence, road behaviour, vision, these and other qualities are given separate markings, the final judgment resting upon the whole profile. This method works, and those who rank badly upon the tests are shown by their records to be liable to an excess of accidents. Yet while some of the tests certainly measure a definite quality—reaction time and vision, for example—it is possible that some are not so specific and, correlating in their results with accident proneness, approach to the æstheto-kinetic tests in measuring an unknown something.

Good results are claimed for work along similar lines in Paris and some American cities. In the latter, however, another mode of attack is introduced. The accident-prone driver is interviewed, and W. V. Bingham has described the extraordinarily mixed bag of results that were obtained. A single bad habit in driving, susceptibility to a small dose of alcohol, wilful road-hogging, loss of sleep, family worries, reckless operation calling for discipline, lack of correct instruction, were found as causes, whilst a few drivers seem to have been born into the accident-prone class. For the tramways and buses of Paris it is claimed that psycho-physiological selection before training has reduced the percentage of unsuitable trainees from 20 to 3·4. (Note here the appearance again of that 20 per cent. discovered by Farmer and Chambers and by myself.)

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[1] Since the possibility arises of finding clinical value in this test as a diagnostic weapon, it must be pointed out that a statistical correlation between factors does not imply that one of them can be used in an individual case to infer the presence of the other. Subjects with hysterical or anxiety symptoms tend to do a bad dotting; so do the accident-prone; but not every subject belonging to one of those groups makes a bad score, nor does every subject with a bad score belong to one of those groups. Only one kind of dotting is found almost invariably to indicate a particular temperament; an exceptionally good score accompanies that obsessional make-up commonly described as "nervy" or "highly-strung," and this even in cases where disabling symptoms are present, so long as they are not associated with pathological anxiety. On a few occasions a very good record has put me on the track of obsessional symptoms that I might otherwise have missed, but that is the only claim I make for any clinical value in the tests beyond a confirmation of opinions already formed.

Some Individual Examples

Leaving these general considerations let us glance at isolated examples that may reveal specific factors.

A building operation necessitated the engagement of a large staff of labourers, and among them were many skilled workers—engineers, for example—who through economic conditions were compelled to accept this low-grade task. The medical man in charge noted an excess of accidents in this group and, in discussing it with me, ascribed it to the fact that the job was temporary but that disablement, with its accompanying compensation, might be more lasting. Please accept my assurance that my colleague, who was not ignorant of psychopathology, did not ascribe this to a witting attempt at fraud, but believed that the total of conditions could so affect the men that unconscious motivation came into play. Cases to be described later give, I think, proved examples of unconscious motivation.

Another case is cited by an American writer where dismissals on a large scale took place, falling by preference upon recently engaged workers. The elimination of inexperienced men was expected to reduce accidents, but the number showed a considerable increase. The explanation offered was that the remaining workers were in such dread of dismissal that the worry affected their work and led to accidents.

In both these cases I would point out that the explanations, though plausible, were quite speculative and could perhaps have been tested by the method of the interview.

Therapeutic methods that involve detailed histories or the application of psycho-analytical principles may lead to the elucidation of accidents that happened in the past. One war sufferer wrote for me his autobiography, which involved a hard childhood and the growth of pathological fears. I will give in his own words the description of an accident brought about by these fears :—

> Now I have managed to learn to work the signal box, and I get shifted to a signal box at ...... ; my first night on is a Friday night, and the box must be washed out; the man I am relieving stays a little while whilst I take off a few trains, then he leaves me. Whenever he goes there is a fear attached to me, yet why it should be so I can't tell, so I starts to wash the floor to help take away this fear ; whilst doing so there is a goods train taking on full wagons and leaving empties ; I have two trains belled on to me. I take them on, I go on with the floor washing, then I hears three whistles as if for me to close the points, the next thing I hear is a crash and I see the guard running down to the box. He tells me I have fouled both main lines, and there I am, with two passenger trains taken on. I run to the phone and tells both boxes to stop both trains, lines are fouled, after that I am useless, fit for nothing, another man is put in the box and the stationmaster takes me to his house and trys to soothe me down. I am courtmartialled over this and has to appear before all the directors, but I was favoured to have sitting on the court, district superintendent . . . . who came only six miles from my native home. I mind the last question I was asked, have I ever been seriously hurt about the head any time. I told him about my brother letting me fall 40 feet and had been carried home as dead. I don't remember any of this incident of my life. However, I was reduced to a carriage cleaner only, for things might have been worse for me.

Since we can hope to prevent accidents only by understanding their causes we may note the inadequacy of cross-examining a man as at a court-martial. I suggest that we are missing important elements in causation by not systematically making a psychological examination of men whose unexpected reactions have brought about an accident. I think they would be in a frame of mind ready to give every help to a trained interviewer, though assurances might be necessary that confidence would be respected.

A shell-shocked soldier gave a history of having been knocked down, years before, by a wagon on a dark road and receiving a fracture of the skull. Bony deformity in the occipital region marked the site of an old compound fracture ; he claimed to remember nothing of the accident or of the preceding 24 hours, and the case seemed quite ordinary. Like many shell-shock subjects, he passed readily into a hypnoidal state in which he recapitulated suppressed episodes, and I took advantage of this to attempt the recall of the accident, in which I succeeded. He had been wandering about the country out of work, depressed, and hopeless ; leaving a village where he had failed to get assistance, he met a wagon as he turned a corner and fell under the wheel. He was not knocked down at all.

Another war patient described how he once found his bicycle getting out of control down-hill ; instead of trying to control it he became agitated by the impulse to pedal harder and force an accident. In this he succeeded and did himself some injury ; later, in the course of treatment, he recalled being initiated into masturbation whilst held on a bicycle ; he at once linked this up with the accident, relating that both to self-punishment and the masturbatory impulse.

A gentlewoman under analytical treatment told of an impulse to pick up a poker just withdrawn from the fire but no longer red hot ; she did it, and the resulting burns were treated sympathetically as acquired in ignorance of the state of the poker. She worked out the unconscious motivations of the impulse, which turned out to be very complicated.

Obsessional Impulses and Road Accidents

Cases are frequent in which an unconscious motivation seems obvious, but only when the patient reveals it can the evidence be convincing. Jung once wrote, concerning the unconscious :—

> "One of the most frequent forms of danger is the instigation to accidents. Accidents of every sort, in greater number than the public would ever guess, are of psychological origin. Ranging from insignificant mishaps like stumbling, bumping oneself, burning the fingers, &c., to automobile accidents and catastrophes in the mountains, instances may be found of psychological causation, the accident being sometimes prepared weeks or even months ahead."

Psychoneurotic inhibitions or impulses easily predispose to accidents, especially in motor driving. I know a colleague who has an impulse to charge at an oncoming vehicle, and takes it so seriously that he has given up driving. The driver of a commercial vehicle whom I saw at a clinic admitted the same symptom, sometimes so strong that at the sight of a doctor's plate he felt that he would stop driving and rush in with an appeal for help ; I trust that he followed my advice to seek another occupation, for one's ethical position in such a situation is difficult. Fears of something on the right or the left, or coming from behind, are common symptoms that can influence driving though they are not specific to it. I had a patient who, among a wealth of symptoms, owned to one that made it impossible to drive behind another car where he could not see the road ahead of it ; he was impelled to draw out and try to pass.

All this discussion has an obvious bearing upon that road slaughter which has become so terrifying. Lord Ponsonby, speaking on the wireless recently, said that as a pedestrian he resented having to throw himself into the ditch by a country road when a driver came along at 60 or 70 miles an hour. But, like many of us, he failed to ask *why* that driver comes along at such a pace. We may select drivers, we may insist upon proper instruction, may stress good manners on the road, educate pedestrians, teach "safety first" to school-children, but we cannot escape the conclusion that, without high speed, motor-car accidents would be much fewer, even though it may be possible to demonstrate in every accident that something other than speed was its decisive cause. An obsessional impulse to speed is found in some people. One pedal cyclist described this impulse to me, and said: "I know I shall get it in the neck some day; but I can't help it, I *must* rush." He also suffered from telegraphists' and writers' cramp, in the causation of which the impulse to rush played a part.

Used with a strict meaning the word *obsession* indicates an urge to think, feel, or do something that is recognised by the subject as irrational and may be effectively resisted. Used in that sense the word is not applicable to the impulse to speed that exists in many drivers, which is neither recognised as irrational nor effectively resisted. To speak still in the language of psychopathology, it is defended by rationalisations, by pseudo-reasons and justifications which are evolved to account for something that arises from quite different and perhaps unknown motivations.

Often, indeed, it is treated as calling for no justification, and a correspondent in the *Times* of May 7th naïvely provides an example. Under the heading of "Sneezing at the Wheel," he remarks that "the danger resides in the fact that it is virtually impossible to sneeze with the eyes open, and at 60 or 70 miles an hour that split second of blindness suffices to precipitate disaster. My own practice, when I detect the premonitory symptoms, is to slow down instantly. . . . . I am quite sure in my own mind that a sudden sneeze is the true explanation of many otherwise unaccountable motoring accidents."

The public acceptance, twice within seven days, of 60 to 70 miles an hour as a speed calling for no question, gives food for thought to one whose experience of road traffic goes back to the use of the old tall bicycle. How has it come about that we are reconciled to the speed of an express train on our high roads? If one questions people, especially drivers, about the attraction that high speed undoubtedly possesses, the answers indicate that fundamental instinctive tendencies there find satisfaction. Sense of power, aggressiveness, risk, or in more general terms "the thrill of it," are part of the attraction, and whoever has heard an enthusiastic motor-cyclist describe the thrill of travelling at 70 miles per hour may ask whether it is not time that the satisfaction of this particular instinctive urge should be frowned upon not merely because of its material but also of its psychological danger. To provide a reasonable outlet for instinctive tendencies is one thing, to cultivate their excessive development is another. The change from the days of the tall bicycle has come about by the gradual cultivation of a tendency that grows by being fed, and only the general distribution of the instinctive tendency has allowed us to become reconciled to a total of killed and maimed that a few years ago would have appeared as fantastic. Every mechanical improvement, whether in roads or machinery, is brought into the service of increase of speed, and unless we can in some way retrace our steps the casualty totals will increase. If this view is correct, it follows that palliatives that do not take into account the checking of the instinctive tendency may themselves make matters worse. Instruction may be enforced upon all would-be drivers; but the personality of the instructor may be such as to infect the learner. The improvement of roads is already recognised as leading to increased accidents, and the objection of cyclists to carrying rear lights has behind it the not unreasonable belief that another check upon speed—though a dangerous one—will be removed.

CONCLUSION

Preventable accidents constitute a problem of human behaviour, and, where that is concerned, facile explanations and obvious measures of control are apt to disappoint. If I have not simplified the subject it is the fault of the subject and our misfortune; but it is clear that in the recent work here described we are feeling our way to an understanding of the behaviour problems underlying accidents and thereby furthering their prevention.

MILLAIS CULPIN, M.D., F.R.C.S.

Professor of [illegible], London
School of [illegible] Lecturer
on P[illegible]

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

THE *following appointments are notified: Surg. Lts.* M. G. Ross to *Kent* and J. G. V. Smith to *Kent* and to *Suffolk.*

ARMY MEDICAL SERVICES

The undermentioned Lt.-Cols. from R.A.M.C. to be Cols.: Bt. Col. G. G. Tabuteau, G. H. Richard, H. H. A. Emerson, Bt. Col. (temp. Col.) W. P. MacArthur, Bt. Col. W. Benson, R. A. Bryden, A. E. S. Irvine, C. J. Wyatt, Bt. Col. F. D. G. Howell, F. C. Sampson, T. S. Blackwell, C. M. Drew, F. A. McCammon, A. Dawson, R. E. U. Newman, J. B. Grogan, E. M. O'Neill, G. B. Edwards, Bt. Col. J. W. L. Scott, T. C. C. Leslie, and A. C. Amy.

ROYAL ARMY MEDICAL CORPS

The undermentioned Majs. to be Lt.-Cols.: M. White, J. J. D. Roche, A. S. M. Winder, H. R. Edwards, W. B. Rennie, W. Mathieson, G. H. Dive, Bt. Lt.-Col. R. Gale, K. Comyn, F. R. Laing, Bt. Lt.-Col. J. M. Weddell, A. P. O'Connor, H. G. Robertson, H. V. Stanley, P. C. Field, R. M. Davies, J. T. Simson, R. F. Bridges, Bt. Lt.-Col. H. G. Monteith, Bt. Lt.-Col. C. H. Stringer, J. K. Gaunt, J. R. Hill, Bt. Lt.-Col. B. Biggar, C. M. Finny, G. Wilson, E. G. S Cane, W. A. Frost, C. D. K. Seaver, W. Bisset, W. L. E. Fretz, T. C. R. Archer, R. Davidson, J. M. Elliott, F. R. B. Skrimshire, W. L. Webster, E. B Allnutt, S P Sykes, A S. Heale, A. G. Biggam, R. K. Mallam, D. T. M. Large, A. Hood, E. A. Strachan, C. J. Blaikie, D. T. Richardson.

The undermentioned Capts. to be Majs.: F. C. Hilton-Sergeant, W. L. S. Cox, W. B. F. Orr, F. J. O'Meara, (Provl.) T. W. Davidson, K. Fletcher-Barrett, (Provl.) C. R. Christian, (Provl.) R. J. Rosie, and remains secd., J. Huston, (Provl.) E. G. Dalziel, C. W. Greenaway.

The undermentioned Lts. to be Capts.: W. B. F. Brennan, P. J. Richards, C. A. de Candole, W. A. Robinson, N. P. Breden, C. M. Marsden, P. T. L. Day, F. K. Bush, E. S. Tweedy, M. J. Kohane, R. C. Langford, L. T. *Furnivall, W. H. Hargreaves, T. M. R. Ahern,* R. Johnston, J. C. Barnetson, J. K. Chappell, J. B. Macfarlane, H. J. R. Thorne, B. Blewitt, T. J. Moloney, A. P. Trimble, A. D. Low, J. M. Low, H. C. M. Walton, E. W. Gibbs, J. L. Martin, H. K. G. Nash, H. Clain, T. L. O'C. Ryan, J. P. Douglas, H. N. Walker, J. W. A. McIver, A. D. Bourne, G. W. Crimmin, G. W. Kendrick, R. St. J. Lyburn, R. T. Shipman, S. G. M. Lynch, F. King, J. N. Concannon, C. King.

ROYAL AIR FORCE

The undermentioned are promoted :—

Wing-Comdrs. to be Group Capts.: H. A. Treadgold, D. Ranken, A. S. Glynn and F. N. B. Smartt.

Squadron Leaders to be Wing-Comdrs.: R. A. G. Elliott, J. M. A. Costello, P. H. Young, P. T. Rutherford, T. Montgomery, and H. L. Burton.

Flight Lt. (Hon. Squadron Leader) W. S. Stalker *relinquishes his temporary commission on completion* of service.

SPECIAL ARTICLES

MORTALITY OF BRITISH MERCHANT SEAMEN

By Fleet-Surgeon W. E. Home, O.B.E.

What is the death-rate of British merchant seamen, and is it higher or lower than that of the average worker in British industry? Important questions for answering which there is no accurate information available, yet a discussion of knowledge now obtained from the figures for 1929–30 may do something to advance the study of the hygiene of seamen and to lessen their deaths in future.

In the first place, what is the general death-rate of British industry? The basic figures for England and Wales are got from the Registrar-General's Decennial Supplement to his report on the Census, the latest being "Part II., Occupational Mortality, 1921," issued in 1927 in relation to the Census of 1921, the basic table being that on p. 2, dealing with "All Occupied and Retired Civilian Males," ages 16 and over. Here are assembled all the 509,204 deaths that had been registered from this group during the three years 1921–23, and these, correlated with 35,358,036—three times the numbers in the group as enumerated at the Census—yield a death-rate of 14·32, the average age of the group being about 38.

For some years before this report appeared, in fact since 1924, the Royal Sanitary Institute had been explaining to the Board of Trade that it was important to obtain a death-rate for the employed seamen in the merchant service analogous to the death-rates published annually for the Army and Navy. Labour members of Parliament had been pressing this point of view, and the Board of Trade set up a committee to consider the matter. The committee reported in 1926 that a death-rate for only the employed men of the merchant service (of whom alone the Board has cognisance) would be of no value for comparison with death-rates propounded for other industries, as in these other trades the deaths of men occupied and retired are always considered together. The numbers indeed of British merchant seamen employed on ships were roughly known to the Board as were also their deaths, but as regards men who had left the sea, their deaths were reported, not to the Board, but to local registrars; nor was their total number known. The committee asked the Registrar-General to do what he could in his then forthcoming report to elucidate this problem. Accordingly in 1927 he produced, on p. 128 of his report alluded to above, a statement of all the British seamen, ages 20 to 64, that had come to his notice through examining the 1921 Census reports for the United Kingdom as well as the Board of Trade's Census of Seamen for the same year; they were in all 199,306, their average age being about 33. With these figures he printed a summary of their deaths at sea reported to the Board of Trade in 1921–23, and of their deaths ashore (unemployed and retired) extracted from the returns of local registrars. He found in all 7924 deaths, corresponding to a death-rate of 13·27, a statistic incomplete indeed, but far more nearly complete than anything we had had before.

To get a comparable figure from industry ashore it was necessary to extract from the basic table the number of deaths and of persons noted between ages 20 and 65; the deaths were 266,384, the years of life, 29,114,580, yielding a death-rate of 9·15, the average age being again about 38. Within their industry seamen are much younger than men in other industries, and as the young have a lower death-rate, if seamen had died according to the rates for men of their ages in the basic table, their standard death-rate would have been 7·17; so their actual rate, 13·27, was nearly double the standard. Seafaring thus seems an unhealthy occupation. In fact, the Registrar-General, without even making allowance for their younger ages, thought their mortality 75 per cent. worse than the average (see Diagram 1). Thus we have these death-rates for men between 20 and 65:—

	Average age.	Death-rate.
All occupied and retired civilian males ..	38	9·15
All seamen, standard rate	33	7·17
All seamen, actual figures	33	13·27

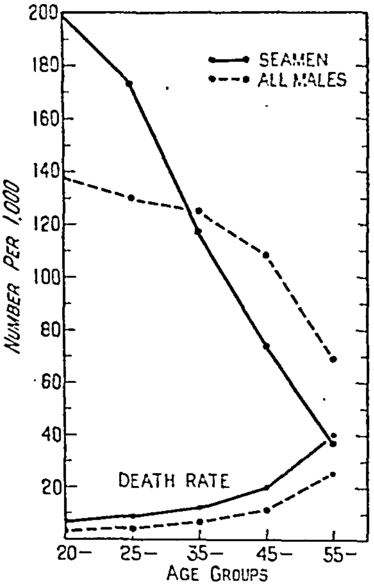

FIG. 1.—The two upper curves show the age-distribution per 1000 of seamen aged 20–64 years and the age-distribution of all occupied males of the same ages in England and Wales. The two lower curves show the death-rates per 1000 of seamen and occupied males. (The chart is based on figures published in the Registrar-General's Decennial Supplement, England and Wales, 1921; Part II., Occupational Mortality, 1927).

It was shortly recognised that the figures of the Registrar-General were out of touch with reality, for on one side the class of British merchant seamen was too little defined, and on the other not all deaths reported were relevant, nor were all the relevant deaths brought to account. So in 1929 the Board of Trade initiated another examination of the records of seamen and their deaths in the 12 months from Oct. 1st, 1929, to Sept. 30th, 1930, in the course whereof the reports and certificates of deaths, whether sent to the Board of Trade or to the local registrars, were carefully scrutinised, and several were excluded from computation as not applying to men who had served in the British mercantile marine. Ultimately it was decided that there had been in the particular year under scrutiny among the 127,518 seamen actively employed on ships and enumerated in the 1930 Census of Seamen, 642 deaths, and in addition, among seamen unemployed or retired, 2524 deaths ashore in the United Kingdom. The total number of these seamen unemployed or retired was really unknown at that time, but there will be an estimate in the final report of the Registrar-General on the Census of 1931. Yet the number even then will be uncertain, partly because seamen when retired take up other employments to which they now assign themselves in the Census, and partly because seamen, during the years they are going to sea, are constantly flitting between the employed and the unemployed (or retired) categories and back again, far oftener than other workmen, whose passage from employment to retirement is usually definitive, and rarely reversible; seamen, on the other hand, are always becoming unemployed at the end of cruises, though they would be surprised, perhaps indignant, if they were then supposed to be retired. See what may happen at home: a seamen leaves a ship on a Tuesday, that night he is unemployed and so remains till Friday, when he "signs on" on another ship. Suppose that that Friday evening he is run over by a car, and (*a*) is taken to hospital, where he dies that night. His death is now reported to the Board of Trade as that of a seaman on articles. Next suppose he was (*b*) not at once killed; his place on his ship must be filled, so he is discharged and replaced, and when he dies in a week, his death is now reported, not to the Board of Trade, but to the local registrar as that of a retired seaman; this is what would have happened (*c*) if his accident had happened on the Thursday when he really was unemployed. There is no list or enumeration of retired or unemployed seamen at any point in their career, so a death-rate other than approximate for them is unattainable; their number is unknown, and it is something of an accident if their deaths are recorded as those of British seamen, and if the deaths so recorded are truly those of seamen in the merchant marine.

Nevertheless this last investigation by the Board of Trade, with its results published in the Blue Book, "Statistics relating to the Mortality in the Mercantile Marine" of 1932, has told us much that is new and qualitatively important. The only attempt at vital statistics for seamen are those published by the Board of Trade. In a recent publication of the International Labour Office on the diseases of seamen, no other country seemed able to give any figures about prevalence of a disease nearer than the proportion of its deaths to total deaths. The Blue Book referred to above shows on Table XVII. (p. 51) that for 502 (20 per cent.) of the 2524 deaths ashore, unemployed and retired, in the special year, their time since leaving the sea was unknown, but that of the other 2022 deaths, 1043, more than half, occurred in the first five years after leaving the sea, 294 in the second five years, and only 685 in all the years thereafter. Again, of the 1043 who died in the first five years, 625, more than half, died in the first year, 155 in the second, 98 in the third, 86 in the fourth, and 79 in the fifth. And again, of the 625 who died in the year after leaving the sea, 298, nearly a half, died in the first three months, 151 in the second, 90 in the third, and 75 in the fourth three months after leaving the sea. So deaths are far more numerous just after the men leave the sea, and decrease steadily per unit of time for the next ten years. This seems to suggest that many men become unemployed or retired because they are ill, in fact dying; the merchant service, unlike the Navy, recognises no invaliding, the men must arrange that for themselves.

Nothing is said in this Blue Book about the diseases which cause such early mortality among the retired seamen, for the inquiry, like others at that time, was hampered by the need for economy. But that we should know what these diseases were was obviously a matter of great importance, and the President of the Board of Trade, approached by Sir Francis Fremantle, M.P., a former president of the epidemiological section of the Royal Society of Medicine, of which I have been a member since 1887, kindly allowed me to examine the certificates of the "deaths ashore in the United Kingdom" that had occurred during the special year, and within 12 months of leaving the sea. Some interesting figures emerged, published in THE LANCET (August 19th, 1933, with a preliminary note on p. 371). Here one need only say that while in 1929–30—and we may reasonably suppose, somewhat similarly in other years—there occurred 642 deaths among the 127,518 employed seamen, there came to notice nearly as many, 622, among what one would expect to be a much smaller population, the unemployed and just (within 12 months) retired. Among the employed the deaths by disease were 288, but there were 556, nearly twice as many, among the unemployed and just retired. Again, and more striking still, if we take 288 as the number of deaths by disease of the year among the employed, it is not extravagant to suppose these deaths equally distributed throughout the year, that is 72 per quarter; but we are then astonished to find that the deaths by disease in the first three months after leaving the sea were 267, nearly as many as in a whole year among the employed, four times as many as in three months among the employed, whose ranks they have just left, without having had time yet, one would think, to have picked up new illnesses (Diagram 2).

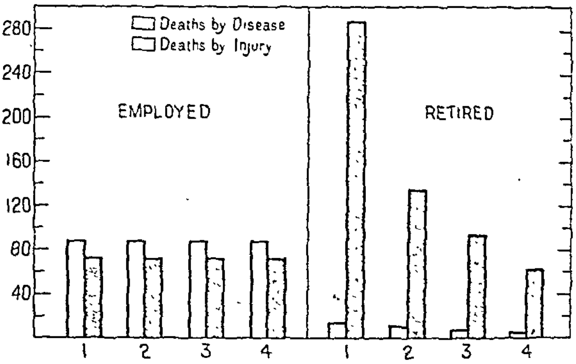

FIG. 2.—Deaths of British merchant seamen by disease and accident, during employment and after retirement. The number of deaths aboard ship (288 by disease and 354 by violence) during one year has been divided into four quarters so as to be comparable with the number of deaths in the first, second, third, and fourth 3 months after retirement, during the same year.

The figures about deaths from pneumonia and tubercle (all) were arresting. Of the 127,518 employed seamen there died during the year 31 of pneumonia and 24 of tubercle; as we may say, per quarter, 8 of pneumonia and 6 of tubercle, but of the "unemployed or just retired" there died of pneumonia, in consecutive periods of three months after leaving the sea, 44, 12, 4, and 3, in all 63, and of tubercle (all) 29, 30, 34, 17, in all 110. If deaths occur like that in other than the special year (and why should they not?), there will fall to be added to the deaths in the Annual Return of deaths of employed seamen, from pneumonia twice as many, and from tubercle, four times as many, before we are in a position to realise how many deaths from these diseases should really be ascribed yearly to service in merchant ships, or what amount of preventable disease there is to combat in the mercantile marine.

Dr. J. Howard-Jones and others who, like myself, have long been urging the need for better sanitation on board and more cubic space for the men in the crew spaces of merchant ships, have been constantly met with the argument that the relatively few deaths from pneumonia and phthisis recorded in the annual Return of Deaths, issued by the Board of Trade, rather tended to contradict us, and to show we were exaggerating the defects of ships; but if there is at least twice as much pneumonia among British merchant seamen, and four or five times as many deaths from tubercle as, before this Blue Book came out, we believed, it may well be we were right all the time.

Another thing: is it right for shipowners to unload yearly 100 cases of tubercle on to the general public to be cared for till they die, when many of them must, without any reasonable shadow of doubt, have become infected at sea? Should they not be a charge on the industry, as are miners suffering from silicosis, under the Act of 1918?

How many similar deaths of men just retired, and dying as civilians, should be charged to the Army, Navy, or R.A.F.?

Tubercle (all), 1930

—	Total	Cases	Per 1000	Deaths	Invalids	Deaths of invalids within a year
Army ..	178,384	248	1·4	31	200	Not known
Navy ..	88,840	215	2·4	15	210	,,
R.A.F. ..	32,000	27	0·9	3	27	,,
Merchant service	127,518	—	—	24	—	110

The figures in this paper lead to no death-rate, so are obviously incomplete. Of the 2524 deaths of retired seamen in the special year, 294, or 11 per cent. of them, were due to tubercle. Among the 622 deaths, already discussed, occurring within a year of leaving the sea, 110, or 17 per cent., were due to tubercle, the chief cause for this group. The toll which tubercle takes of seamen is serious. What a pity the Board of Trade had not had a D.P.H. or medical statistician on the staff in 1900 to get out facts like those in the recent Blue Book when the Merchant Shipping Act of 1906 was on the stocks. Then, in addition to good orders about foods and cooks, we might have had others about sufficient cubic space for seamen on ships, as their risks would then have been widely known, and not only, as at that time, to medical officers of health to port sanitary authorities.

The figures here submitted are incomplete, but such as they are it has taken nine years to get so far, and as no more knowledge is expected to be obtainable in the immediate future, they are submitted for the information of future students of that rather neglected chapter of hygiene, the mortality of British merchant seamen.

POSTSCRIPT

A rough approximation to the true death-rate of employed British merchant seamen can be got for any year in which the Census of Seamen is held, though this only gives their number on one day out of the 365; for their deaths are recorded pretty accurately every year by the Board of Trade. But deaths of seamen retired, and their numbers, are nowhere stated; and a death-rate for seamen "occupied and retired" is therefore unobtainable.

Death-rates per 1000 for the Merchant Service (occupied)

Census date	1901	1911	1921	1930	1931
Total force	120,412	136,580	96,072	127,518	108,882
Death-rates from—					
Disease	5·8	4·7	4·3	3·1	3·1
Violence	8·0	10·9	4·6	2·4	2·3
All causes	13·8	15·6	8·9	5·5	5·4

The death-rate from violence in sailing ships in 1901 and 1911 was 14·3; it is not known in other years. In 1911 673 seamen were lost in the *Titanic.* In 1929–30 deaths by disease for the first time exceeded deaths from violence. Deaths by alcohol are here included with deaths from disease.

Service Death-rates in 1931

—	Merchant service.	R.A.F.	R.N.	Army.
Total force	108,882	32,448	87,075	178,384
Death-rates from—				
Disease	3·1	1·51	1·3	1·76
Violence	2·3	2·9	0·9	1·01
All causes	5·4	4·41	2·2	2·77

The only death-rates with which those of merchant seamen are at all comparable are those of the men on the active lists of the fighting services, and it must be remembered that all these have quite differing age-distributions. These are given here for 1931, the latest date for which all are available.

A CONFERENCE AT HARROGATE

UNDER the auspices of the British Health Resorts Association a conference was held on Saturday, May 12th, at Harrogate, in which the methods devised at Harrogate for dealing with diseases of the liver and of the skin were made the subjects of set discussion. The Physical Medicine Section of the Royal Society of Medicine was holding its annual general meeting at the same time, and its members coöperated in the debates.

Mr. C. D'Oyly Grange, O.B.E., F.R.C.S., president of the Harrogate Medical Society, presided at the morning session. He welcomed the Association and the section of the R.S.M. to Harrogate, and estimated that before the country went off the gold standard immense sums annually were spent in French spas for treatment that could often be obtained in British resorts. The two topics at this, the first conference of the Association to be held in Harrogate, were important ones, and he called upon Prof. Langdon Brown to open a discussion upon

The Use of Spas in Diseases of the Liver

Prof. LANGDON BROWN, Regius Professor of Physic at Cambridge, said that he would first admit that the rest and change afforded by spa treatment are beneficial when assisted by regulated diet and a scheme of life in a healthy environment, and pointed out that an efficiently organised spa would be able also to afford the benefit to be derived from subsidiary methods of treatment. An impressive body of evidence had been accumulated, he said, as to the metabolic effects of water, and what is true of metabolism in general should be especially true of that great metabolic workshop the liver. He would not try to detail the therapeutic uses that might be made of spas in diseases of the liver, but he reviewed the recent additions to medical knowledge of the functions and diseases of the organ, and asked what practical application of this learning could be made through special methods at the disposal of the spa. Ten years ago H. Maclean and O. L. V. de Wesselow had improved Straus's lævulose test of hepatic efficiency by examining the effect of the ingestion of lævulose by the blood-sugar curve; the method of direct analysis of samples of bile through the duodenal tube was now coming into use; and van den Bergh's application of Ehrlich's di-azo test for the estimation of bilirubin in the blood was revolutionising our ideas of jaundice. He agreed with A. Hurst's recent statement that these three tests are the only ones that persist as valuable; and through the same period biochemical methods had been simplified and knowledge extended by the discovery of insulin, and of the storage of certain hæmopoietic features in the liver, rendering the rewriting necessary of the stories of carbohydrate metabolism and the pathology of the anæmias. The recent discovery of the influence of choline on the fat metabolism he welcomed as promising. The main work of the liver he summarised as follows:—

"Situated on the path by which all the blood from the digestive organs enters the systemic circulation, it is not surprising to find that the liver helps to prepare all three foodstuffs for utilisation by the tissues. The bile it forms is at once an excretion and a secretion. But further, the liver is an important agent in detoxication and in maintaining the constant composition of the blood"; and he pointed out that the liver has to coöperate closely with the pancreas and the spleen in the regulation of digestion. In the assimilation of proteins he suggested that spa treatment would be of assistance, and he instanced diseases of the liver where there is extreme circulatory disturbance, as in the later stages of cirrhosis. Again, under the less severe conditions of liver accompanying the failing heart, anything which aided the true circulation of the blood through the liver would help to maintain the proper nutrition of the cells and diminish the inflow of toxic material into the circulation. Herein, he pointed out, lay the main advantage of liver packs and the similar methods applied at Harrogate. Coming next to the carbohydrates, where glycogen stores of the liver depend upon the balance between certain endocrines, opinion to-day, he said, is tending to attribute the amenable glycosuria of later life to defective storage. Biochemical advances had shown that the antitoxic power of the liver depends on the good content of glycogen, and patients receiving spa treatment, he urged, should be given the help to be found from insulin and dextrose in toxic states.

After dealing with the antitoxic and anaphylactic properties of the liver, Prof. Langdon Brown agreed with recent workers that the liver acted mainly as the storehouse of a principle formed elsewhere, while preserving the power of adding finishing touches. He discussed the value of liver or liver extract in the treatment of pernicious anæmia, and with regard to the so-called primary anæmias, he said that they could be explained in terms of failure of some stage or other in the maturation of the red corpuscles in the red marrow. But it is, he said, the principle stored in the liver which is essential to the formation of normoblasts from megaloblasts. "The other end of the story," he added, "is that the hæmatoidin supplied by the spleen from disintegrating erythrocytes is converted by the Kupffer cells of the liver into bilirubin, the former giving the indirect and the latter the direct van den Bergh reaction. The iron salts set free in this disintegration appear to be stored up in the liver ready to be used again in the formation of new corpuscles. The well-known excess of inorganic iron in the liver and spleen found in pernicious anæmia is now regarded by L. J. Witts not as evidence of hæmolysis, as was formerly thought, but of the failure of the red marrow to use this iron in the manufacture of new corpuscles. This would postulate some mechanism which normally transports iron from the liver to the red marrow." Prof. Langdon Brown acknowledged that he was rather explaining the activities of the liver in general metabolism, as a guide to further research, than making suggestions for spa treatment more than to stress the need of improving the circulation of the gland in certain liver conditions.

Turning from the internal to the external and excretory functions of the liver, Prof. Langdon Brown pointed out that the gall-bladder allowed a discontinuity in discharge of a fluid being continuously formed, while the bile, when in the bladder, lost water and received cholesterol and mucin, thus becoming concentrated and viscous until obstruction might occur. More and more, he said, he was convinced of the importance of preventing the accumulation of viscid bile in the gall-bladder, while he subscribed to the view that infection arrived at the gall-bladder as much through surrounding lymphatic channels as by ascent of the common bile-duct. He concluded by referring to the great opportunities offered at Harrogate for research in these matters into individual human reactions.

Dr. J. W. McNee spoke from the standpoint of a practical physician of the use that might be made of spas in the treatment of acute and chronic liver diseases. He testified to the value of spa treatment in most chronic conditions, mentioning as amenable hepatitis generally but not including malignant conditions. Injury of the liver, acute and chronic, he pointed out might range between any febrile or inflammatory condition, from which recovery might be expected, and the total breakdown of acute necrosis. He laid stress on the recuperative power of the liver, saying that as much as four-fifths of its great expanse might be destroyed when the remaining one-fifth would discharge the duties and develop cells and ducts to that end, a circumstance which he described as "the doctor's trump card." Treatment of the damage might be successful if the damager could be rendered inactive—e.g., if alcohol were cut off. In catarrhal jaundice, usually classed as affecting the ducts, there was often damage to the cells. Recovery here would be obstinate and the coöperation of the surgeon might be necessary. Alluding to what was once a routine procedure in gall-stones—namely, the administration of olive oil—he pointed out that it was a remedy for the flatulence that often formed a most distressing symptom in cholecystitis. Dr. McNee then spoke of the value of the duodenal tube (blunt-pointed) in diagnosis, and concluded by testifying to the great service to medicine of spa treatment through its special medical experience, its amenities, and discipline.

Dr. Curtis Bain read the notes of a series of cases of diseases of the liver, all inflammatory, classified them under their symptoms, and described the common regimen of spa treatment in accordance. Concerning the alcoholic liver he expressed the opinion that alcohol was a poison secondary to cholecystitis and not to be regarded always as the origin. He attributed the good results of spa treatment in liver diseases to the influence, in this order, of (a) discipline —which he allowed was hard to evaluate; (b) liver-packs when skilfully administered; and (c) sulphur water. He then described the results of a series of heroic experiments upon himself with the duodenal tube to ascertain the cholegogic influence of Harrogate water.

Dr. Wilfrid Edgecombe gave the details of treatment at the spa suitable to the liver patient, and mentioned the complicated constituents of the water obtainable from the various sources as accounting for the metabolic effects which were cholagogic, diuretic, and antiseptic; he pointed to the presence of barium as effective in depression. The liver pack, followed by the needle douche, was employed as a counter-irritant, while the stimulating baths should be followed by proper massage. In cases of congested liver, with concentrated dark urine and possibly glycosuria, such a regimen might act like magic. He outlined illustrative cases suggesting the good that followed spa treatment in early cholecystitis and perhaps in the first stages of gall-stones indicated by biliary sand.

Prof. D. P. D. Wilkie spoke of the great value of a preliminary spa course in cases where operation would usually follow. The fat flabby subject was not fit for operation in comparison with one who under strict regimen for a few weeks had lost perhaps two stone in weight and gained in general health and muscular tone. Such properly prepared patients, trained for the ordeal like athletes for a boat race, sometimes might escape operation, a circumstance which he claimed as "a triumph of conservative surgery." He mentioned that delay in operation, in cases of obdurate gall-stones, subjected the patient to the risk of malignancy, and noted that the biliary surgery of to-day thought in terms of general physiology rather than in those of anatomy.

Dr. Manson-Bahr spoke of the progress of therapeutics in tropical disease as having removed large classes of disease from the sphere of spa treatment, and, while he doubted if the once popular term "tropical liver" had ever been an accurate description of an entity, he said that there was ample room for further research into the relations between climate and disease. Undoubtedly the recovery-rate in England was much higher than on the spot in many cases of illness sustained abroad.

Dr. M. B. Ray, president of the Physical Medicine Section, R.S.M., presided at the afternoon session, when a discussion was opened on the

Spa Treatment of Skin Diseases

by Dr. S. Ernest Dore, who commenced by pointing out decisively that it is to resident practitioners in Harrogate that guidance must be looked for as to which varieties of sulphur or saline waters are best suited to particular ailments. He found the trend of present opinion to be in favour of the exogenous causation of skin diseases, a view borne out by the comparative failure of dietetic measures, of internal drug treatment, and of attempts to remove septic material. He claimed eczema as an example, and pointed to the varying virtues attributed to sulphur, as found in the Harrogate waters. He pleaded the impossibility of mentioning all spa methods as directed to different cutaneous disorders, deciding to concentrate attention on a group of congenital diseases of the skin such as ichthyosis, known in its milder form as xerodermia, and erythemato-squamous affections of which psoriasis was the type. With regard to ichthyosis he pointed out that the discomfort was great owing to excessive dryness and scaliness of the skin, difficulty of movement according to the amount of thickening and fissuring, and liability to inflammatory dermatitis. These, he said, may last throughout the patient's life, although there is some tendency to amelioration as age advances. In this affection some lubricating and keratolytic preparation must be applied more or less continuously to the whole body, and for this purpose nothing is better than sulphur in ointment and sulphur baths. The ointment, he said, must not be continued too long or it may itself cause dermatitis, but its use can be repeated from time to time until the skin becomes soft and free from scales, and thus made amenable to baths and emollients. Coming to psoriasis, he said that treatment by baths was most often used and most likely to be successful, and unless scales were removed by alkaline or saponaceous baths, ointments are practically useless though alkaline sulphur waters have in themselves remedial effects. For the extensive erythemato-squamous eruptions such as the pityriases and chronic seborrhœic dermatitis he found mild sulphur baths suitable treatment. Other conditions enumerated by Dr. Dore as susceptible of relief or improvement by proper courses of sulphur baths were Hebra's and Besnier's prurigo, parasitic skin affections, acne, and the generalised pruritus of the senile type, a list which he described as not attempting to be complete; and while laying stress on sulphur, he could not forget the benefits to be obtained in many conditions from chalybeate waters, mud packs, and colonic irrigations to be readily obtained by patients at a centre like Harrogate.

Dr. Haldin Davis spoke amusingly of the view of the great Robert Willans who had associated the prevalence of cutaneous disease in England with the absence of bathing. He spoke highly of spa treatment in skin diseases and instanced its beneficial results on psoriasis and conditions associated with nervous disorder like lichen planus.

Dr. F. A. Bearn (Strathpeffer) mentioned, as two diseases particularly benefited by spa treatment, psoriasis and eczema in the gouty subject.

Dr. Bertram Watson pointed to the value in the treatment of diseases of the skin—"that mirror of the mind"—of mental diversion. In reference to exogenous or endogenous causation he declared his belief in a gouty eczema. He spoke of good results at Harrogate from the treatment of seborrhœic eczema, psoriasis of the chronic limited kind, and acne, while in chronic urticaria he had found colonic lavage with sulphur water useful. Dr. Watson was particularly interesting in his differentiation of the springs of various strengths at Harrogate comparing their actions upon different conditions. He gave figures which showed a very high percentage of skin cases as undergoing successful spa treatment at Harrogate.

Dr. C. W. Buckley (Buxton) said that the time had arrived when dermatology should have more scientific reasoning behind it; not sufficient grounds were forthcoming for particular methods of treatment, so that evidence in favour of procedures depended only upon individual report. He favoured the endogenous view in what he would term gouty eczema.

Dr. Edgecombe spoke of the nervous connexions of skin disease as shown in lichen planus and senile pruritus. Referring to the prescription of regulated diets, he said that the keynote was moderation, and that at Harrogate special diets when ordered would always be obtainable.

Dr. Geoffrey Holmes indicated that where the spa was resorted to for a particular disease a common regimen for diet at the spa could be to a great extent laid down. This did not meet the case at Harrogate, but at all the Harrogate hotels special diets could be obtained in accordance with medical orders for special cases.

Dr. Alfred Cox said that he had heard many criticisms from not unfriendly people, who had visited both British and foreign spas, to the effect that at home there was not effective combination between the municipality, the hotel, and the doctor, for ensuring that the "cures" should be regarded as an organic whole, in which the credit of all parties was concerned.

On Saturday evening a dinner was given at the Hotel Majestic by the Harrogate Medical Society to the delegates and visitors, Mr. D'Oyly Grange presiding. Dr. Bertram Watson proposed prosperity to the British Health Resorts Association, to which Lord Meston, president of the Association, replied. Lieut.-Colonel Byam then proposed the toast of Harrogate, to which the Mayor, Councillor J. H. Newsome, and Mr. D'Oyly Grange replied. The evening closed with a cabaret show and a dance.

The Conference was a great success, the scientific debates being of a practical nature and the social functions, generously organised, being aided by fine weather.

PANEL AND CONTRACT PRACTICE

Insurance of School Leavers

A few months ago the Birmingham insurance committee passed a resolution "that the National Health Insurance Act should be amended so as to bring within its scope all persons who on leaving school enter into insurable employment between the ages of 14 and 16 years," and sent it to every other insurance committee with a request that it might be discussed and adopted. Several committees have discussed the matter; some have agreed with the proposal; others think it is not the time to extend the scope of the Act when sickness claims are so heavy that funds are badly depleted. The fact that no report of discussion on this subject has been received from panel committees or the Insurance Acts Committee may be due to the feeling that doctors ought not to be consulted on such matters; they should just be prepared to treat anyone sent to them under the Act. There are two main reasons why this resolution is popular. The first is that as children are medically inspected and tabulated in the schools up to the time of leaving there is at present a gap in their medical history cards until they arrive at 16 when they become insured under the present Act. The resolution would fill in the gap in those cases where work was obtained on leaving school. The other reason is that it would help to put a stop to the practice of firms who employ children on leaving school and dismiss them at the age of 16 when they become insurable. It may be time for the medical profession to express an opinion on the matter, bearing in mind that the risk would not appear to be large, for most children have had their minor infective diseases whilst at school, and the period from 14 to 16 would not add much to the liability of health insurance.

The Parish Doctor

In a recent issue of *John Bull* a "parish doctor" points out that as his patients have no choice of doctor he has always taken special care to treat them exactly as he would private or panel patients. But these ideals have been wearing thin under the stress of overwork and underpayment. When he started his remuneration was £85 a year or 32*s.* 8*d.* a week for an average of 32·6 services, mostly home visits—almost exactly 1*s.* per service. For this shilling, of which 3*d.* was deducted for income-tax, he had to supply medicines; part of it must be written off for upkeep of surgery and motor expenses, the remainder, if any, was payment for professional services. The rate of payment per insurance service in the same practice was 2*s.* 4*d.*, and this of course did not include drugs. If insurance patients increase in number the payments increase, but the parish doctor's payment remains the same no matter how many patients the relieving officer sends him. They are, moreover, the selected unfit and generally permanently unfit. They are often old people who need a disproportionate amount of visiting. Extra payments under the parish system are few. If sent to a midwifery case by the relieving officer the doctor gets a fee of 10*s.*; if he is called in by the attending midwife the county council pays him two guineas. The council, it should be added, is the paying authority in both cases. For the certification of a person of unsound mind the district medical officer gets a fee of one guinea; if after making a very careful examination he cannot certify the case he gets nothing. It is surely time for the whole system to be overhauled and adequate payment with free choice of doctor substituted.

Arch Supports

These continue to give trouble. It will be remembered (March 10th, p. 544) that a decision of referees given in October, 1933, brought arch supports into the category of splints, and as such to be ordered on the ordinary prescription form and charged to the drug fund. Not many doctors, however, have much experience in ordering the correct arch. It is not sufficient to order Mr. B. a pair of supports without giving details as to the height of the arch; moreover, these supports need frequent adjustment if the support is to do any good. The chemist, as a rule, knows still less about them. He does not stock such things, and when presented with a prescription for a certain size of supports he simply says "I have not any arch supports. You had better go to XYZ who do that sort of work." XYZ are not under contract with the committee and charge the patient for supports. This causes trouble because by this time the patient has heard that he can have these supports "on the panel," so why should he pay for them. It would seem quite obvious that when a patient comes to him with a prescription for arch supports he should send him to some instrument maker of repute with a note asking that firm to deal direct with the patient, but to send the account to the chemist. The chemist would then add his dispensing fee and obtain payment in due course from the insurance committee. When adjustment became necessary the patient would obtain a new prescription and the process would be repeated. But this procedure has not been notified to the chemists. Before the referees came to their decision that arch supports are splints such appliances were often supplied and paid for by approved societies out of additional benefits. The Ministry of Health apparently do not find the position created by this decision at all easy to deal with. It has been suggested that there should be a list of specified splints which can be ordered by prescription on the drug fund, or that there should be a better definition in the regulation of what a splint is, in order to exclude things which a chemist can hardly be expected to supply. A less serious suggestion is that on the analogy of drugs there should be an advisory committee to draw up lists of things that are (*a*) always splints, (*b*) sometimes splints, (*c*) and never splints.

The National Formulary

The Birmingham panel committee has called attention to the difficulties which arise when doctors write prescriptions for medicines under letters which are included in earlier editions of the National Formulary, but are not included in the present edition. It is proper in such cases for the formula to be written in full. There are, however, undoubtedly cases where the intention is to prescribe present formulas, but an old title is erroneously used. For instance, "Mist. Sodæ cum Rheo" is frequently prescribed, although as far as the formulary is concerned this title has been extinct for many years, and to dispense accurately what is ordered it would be necessary to go back to the 1924 edition. No doubt some prescribers wish the "Mist. Rhei Ammon. cum Soda" or "Mist. Rhei Co." of the present formulary to be dispensed, but to refer to the doctor in all such cases is not practicable. It should not be forgotten that there have been numbers of dispensing establishments opened within the last few years which do not possess copies of the old editions of the formulary. Insurance practitioners elsewhere would be wise in their own interests to make certain that they are using the latest nomenclature when ordering a stock, otherwise their cost of prescribing may show an increase which they did not intend.

PUBLIC HEALTH

Local Authorities and Insulin

THE text of the Finance Bill, issued last week, makes known the Government's intention to place insulin on the free list under the Import Duties Act. Whatever effect, if any, this may have on the price of insulin in this country, the decision is a public recognition of the peculiar importance of insulin as a remedy. In 1925 Parliament passed a short Act enabling Scottish local authorities to arrange for providing medicine and treatment for diabetic patients. A recent political conference at Liverpool urged the Minister of Health to give serious attention to the provision of treatment (either free or on reasonable terms) for such patients in England. He has replied that English local authorities can act for the purpose under Section 133 of the Public Health Act of 1875. Referring as it does to legislation enacted long before the discovery of insulin, the reply deserves fuller explanation. The section gave local authorities a general power (subject to the sanction of the Minister) to provide "a temporary supply of medicine and medical assistance for the poorer inhabitants of their district." The Minister, it is understood, sanctioned under this enactment a free supply of simple medicines for hop-pickers in certain rural districts. Specific exercises of the statutory power will be found in the Diphtheria Antitoxin (Outside London) Order of 1910 and the corresponding order for London of the same date, and also the Public Health (Cerebro-spinal Fever) Regulations of 1918. The latter sanctioned the provision, by the councils of administrative counties and of county boroughs, of serum and vaccine together with the necessary apparatus for their use. As regards antidotes and remedies against infectious disease, many authorities have taken special power by local legislation for their provision and supply to medical practitioners with or without charge; an instance of this familiar clause will be found in Section 65 of the Wimbledon Corporation Act of last year. As regards insulin there is, as the Minister observes, the general power under the 1875 Act, but it does not appear that he has given any general sanction as he did in the case of diphtheria antitoxin or cerebro-spinal fever serum. Section 133, which appeared in an earlier form in the Sanitary Act of 1868, looks a little old-fashioned now. Some limitation seems to be connoted by the words "temporary supply," and the reference to the "poorer inhabitants" introduces an invidious element. The consolidation of public health enactments, now in hand, will give the draftsman a chance to modernise the language in the light of present requirements.

A Radiologist for Hammersmith Hospital

The London County Council has decided to make provision for a radiological department at the Hammersmith Hospital which shall be the consultative centre for the whole of the L.C.C. hospitals service. Cases will be sent to the department from other hospitals for expert opinion on diagnosis or treatment. It is recognised that the officer in charge of this department, associated as it will be with the British Post-graduate Medical School, should be of outstanding ability, and it is proposed to make the appointment early in order that his services may be available on questions relating to the equipment and planning of the department. The proposed salary is £1500 a year, the appointment to take effect, if possible, on July 1st.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED MAY 5TH, 1934

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 2 (last week 9); scarlet fever, 3005; diphtheria, 1077; enteric fever, 23; acute pneumonia (primary or influenzal), 1021; puerperal fever, 57; puerperal pyrexia, 128; cerebro-spinal fever, 32; acute poliomyelitis, 6; encephalitis lethargica, 10; dysentery, 8; ophthalmia neonatorum, 106. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on May 14th–15th was as follows: Small-pox, 9 under treatment, 3 under observation (last week 8 and 0 respectively); scarlet fever, 1598; diphtheria, 1684; measles, 2740 (last week 2857); whooping-cough, [illegible]; puerperal fever, 36 mothers (plus 12 babies); encephalitis lethargica, 259; poliomyelitis, 3; "other diseases," [illegible]. At St. Margaret's Hospital there were 13 babies (plus 6 mothers) with ophthalmia neonatorum.

Deaths.—In 118 great towns, including London, there was no death from small-pox, 3 (0) from enteric fever, 91 (33) from measles, 7 (0) from scarlet fever, 48 (9) from whooping-cough, 34 (10) from diphtheria, 42 (12) from diarrhœa and enteritis under two years, and 68 (14) from influenza. The figures in parentheses are those for London itself.

Measles is still diminishing, but 11 fatal cases were reported from Liverpool, 7 from Newcastle-on-Tyne, 5 from West Ham, and 3 from Newcastle-under-Lyme. Bradford, Sunderland, and Northampton each reported a death from enteric fever. Whooping-cough proved fatal in 8 cases at Liverpool, 6 at Birmingham, 3 at Walsall. No great town recorded more than 2 deaths from diphtheria.

The number of stillbirths notified during the week was 282 (corresponding to a rate of 41 per 1000 total births), including 41 in London.

EDINBURGH ROYAL INFIRMARY.—The Edinburgh dean of guild court has approved plans for a new venereal diseases and dermatological department which is estimated to cost £40,000.

CORRESPONDENCE

SANITY IN A MENTAL WARD

To the Editor of THE LANCET

SIR,—Unavoidable circumstances have prevented me from reading till now the annotation with the above heading in your issue of April 28th (p. 909). May I extract the following passage from it in order to point what I believe to be the obvious moral? A "delirious" patient is consigned to the "mental ward of a public hospital." (Incidentally, is not such a place well-nigh legendary?) Your annotator comments:—

> "Ideally it would be possible to have two wards in a general hospital in each large centre reserved for delirious and confused patients whose mental symptoms followed upon physical disease." This arrangement "might lead to general physicians and psychiatrists working in closer association; some general trained nurses would acquire greater acquaintance with some forms of mental disorder; and the medical students would have occasional opportunities of seeing acute psychoses without being wholly dependent upon journeys to distant hospitals. . . . So far as the student is concerned the divorce of ordinary clinical experience from his acquaintance with acute psychotic and psychoneurotic disorders leaves him unprepared for the exigencies of practice when at any time he may need to deal with them."

The moral is that there should be in every city with a medical school a complete indoor and outdoor psychiatric clinic in association with and a recognised part of the general hospital centre. Large towns, without a school, can follow suit. Here such patients as the above—and many other cases of psychosis—could be dealt with, and the skilled coöperation, teaching, and experience referred to could be provided, and research in its highest forms carried out.

This provision, regarded as elementary, and long since made on the continent, has been urged for this country to my personal knowledge for 40 years—and probably longer. But apart from the Maudsley Hospital (a special case), nothing has been done. I read that Their Majesties are to honour with a visit a new mental hospital. The latest of the kind it may be, nevertheless of a familiar kind; not a fundamentally new conception. This is as far as we have got. The occasion is doubtless auspicious. It would be far more so were it concerned with the inauguration of the psychiatric clinic we have so long been pleading for.

I am, Sir, yours faithfully,

EDWIN GOODALL.

Hove, May 9th.

ORAL IMMUNISATION AGAINST TYPHOID

To the Editor of THE LANCET

SIR,—In your issue of April 7th (p. 764) your Paris correspondent gave an account of the annual meeting of the Marseilles Medical Society at which the endemicity of typhoid fever in that city was considered. It was decided at this meeting to recommend preventive vaccination, but exclusively by subcutaneous injection, vaccination by the mouth, according to the Marseilles practitioners, giving uncertain results, an immunity of a few weeks only, and a false sense of security. But in my opinion immunisation by the mouth is to be considered, both in the light of statistics and of experience, as certain as parenteral vaccination, the mechanism of the establishment of immunity being precisely the same in the two cases. The only difference between the results lies in the fact that the oral route seems to establish immunity more rapidly than the hypodermic route. We have seen for instance, during an epidemic of typhoid at the Prytanée Militaire de la Flèche, where the pupils were vaccinated fifty-fifty by the two methods, that among those vaccinated by the mouth the epidemic was stayed much more rapidly than among those immunised by T.A.B.

More than four million persons have been vaccinated against typhoid, cholera, and bacillary dysentery by the mouth, of these some 250,000 under the control of public sanitary authorities. All without exception have declared that the two modes of vaccination had equal value. I do not wish to insist here on the Japanese experience that the oral results are superior to the hypodermic; but comparative vaccinations carried out in India under the control of the Health Commission of the League of Nations, and based on a large number (31,700) of subjects led Dr. Russell to conclude: "The bilivaccine (full dosage) and anti-cholera vaccine (double dose) give much the same degree of protection from attack." Dr. Cluver, who undertook the same vaccinations under the ægis of the Government of South Africa, estimates that the results obtained by oral vaccination are more favourable than those given by injection.

There remains the question of the duration of immunity, said to be "only for a few weeks." This statement seems to me gratuitous. None of the sanitary institutions quoted, nor any government, has reported that oral immunity lasted a shorter time than hypodermic. It is possible that among vaccinated persons there could be found a small minority who cannot be protected, at all events completely; but this minority is found equally among "parenterals." During the war the only method of vaccination was by injection and that did not prevent, among 2334 typhoid cases nursed at Bar-le-duc hospital, the discovery of 469 cases who had been vaccinated by injection one or more times and had contracted typhoid one to eight months after vaccination.

I have only attempted to bring to your knowledge rectifications based entirely on controlled facts, leaving your readers to draw their own conclusions in favour of this or that method of vaccination.

I am, Sir, yours faithfully,

Paris, May 3rd. L. F. DESTOUCHES.

DIAPHRAGMATIC HERNIA

To the Editor of THE LANCET

SIR,—With reference to the case of congenital diaphragmatic hernia reported by Dr. G. H. Greenway in your issue of March 24th (p. 628), and his request for information of other recorded cases, may I draw his attention to the case of G. H. Dodds and J. D. S. Flew (*Univ. Coll. Hosp. Mag.*, 1928, xiii., 43) and to the letter of Dr. Herbert R. Spencer in the subsequent issue (p. 123) where he draws attention to four specimens in the University College Hospital Museum, and to the value of the Obstetrical Transactions, particularly the last (index) volume of 1907 as a record of obstetrical and gynæcological publications from 1860 to 1907. In Dodds and Flew's case, the infant lived eleven days. The hernia was through a persistent pleuro-peritoneal sinus on the left side and was therefore without a hernial sac, and the left side of the thorax contained the stomach, jejunum, ileum, cæcum, ascending colon, transverse colon, spleen, pancreas, and left lung.

I am, Sir, yours faithfully,

STEPHEN K. MONTGOMERY, M.D., D.R.

Johannesburg, April 25th.

BENZENE AND BENZINE

To the Editor of THE LANCET

SIR,—In THE LANCET of May 12th (p. 1025) there appears a report of an inquest on a cellulose sprayer, in which there is reference to "benzine" poisoning. May I point out that this should be "benzene" (benzol)? Benzine, the distillate of petroleum, does not, as far as I am aware, ever produce chronic poisoning. Benzene, a coal-tar distillate, on the other hand, has long been known under certain conditions to produce a form of aplastic anæmia. I draw attention to this because reports of such cases are extracted and repeated, and confusion consequently arises on the relative toxicity of these two bodies.—I am, Sir, yours faithfully,

JOHN C. BRIDGE.

May 15th.　H.M. Senior Medical Inspector of Factories.

THYROIDECTOMY FOR HEART FAILURE

To the Editor of THE LANCET

SIR,—In your issue of Feb. 10th appeared a leading article drawing attention to Berlin's work on thyroidectomy for heart failure (Amer. Jour. Surg., 1933, xxi., 173). Perusal of your article and reference to Berlin's work encouraged me to operate on the following case, and the result up to date has astonished me.

On March 9th a woman aged 66 was admitted to the Buchanan Hospital for heart failure and ? ovarian cyst. Her medical history was shortly as follows:

1898.—Rheumatic fever.
1914.—Myomectomy and ventro-fixation of uterus.
1932.—Multiple arthritis. The patient was told her heart was affected.
1933.—Two heart attacks in October, has been in bed on and off ever since.
1934.—Patient noticed a lump on right side of abdomen.

On admission the patient was seriously ill, cyanosed and dyspnœic with œdema of ankles, congestion of pulmonary bases, and enlargement of liver. A diagnosis of congestive heart failure due to mitral stenosis and aortic regurgitation was made.

On April 22nd, the day before operation, the patient's condition was as follows: (1) Cyanosis of lips and venous congestion of neck. (2) Œdema of ankles. (3) Liver 2 in. below costal margin and tender on palpation. (4) Albuminuria. (5) Moist crepitations at both pulmonary bases and dullness at right base. (6) Exercise tolerance test. Resting pulse-rate 90 and irregular. The patient was told to sit up and lie down ten times. She became dyspnœic and the pulse dropped to 84 and became more irregular.

The patient's mental outlook was pitiable. She was thoroughly sick of life, and readily signed a special permit for operation in which it was stated that she might not return from the theatre alive. A complete thyroidectomy under avertin and novocain block (Labat's method) was carried out on April 23rd, Berlin's technique being followed. Two parathyroid bodies were demonstrated in the left tracheo-œsophageal groove. Oxygen was administered during the operation.

The patient stood the operation well and examination on May 13th, 20 days after operation, revealed the following: (1) Resting pulse-rate 72 and regular; exercise tolerance test (as above); the pulse-rate rose to 80 and gradually dropped to 72 at the end of 1½ minutes, no irregularity developing. (2) Liver dullness to costal margin, a decrease of 2 in.; no tenderness on palpation. (3) Breath sounds weak but audible at both bases; no adventitious sounds. (4) No œdema of ankles. (5) No albuminuria. (6, B.M.R. Reid's formula 15·5 (before operation it was 25·4).

This patient's mental outlook is completely changed. Some of her remarks are:—

"I have not felt like this for years . . . I sleep as I never hoped to sleep again . . . I have no pain in the heart, and none of the awful fluttering I used to have . . . I can now lie comfortably in any position, and do not feel the lack of air. . . Even if I don't get any better, it will have been well worth while."

I am indebted to Dr. Paul Kuhne for the medical notes and for the administration of oxygen during the operation.　I am, Sir, yours faithfully,

D. LIGAT.

Buchanan Hospital, St. Leonards-on-Sea, May 14th.

X RAY CARCINOMA

To the Editor of THE LANCET

SIR,—I wish to offer certain testimony confirming the contention of Mr. W. Sampson Handley (THE LANCET, Jan. 20th, p. 120) that, if any suspicious warty area of a hand of a rontgenologist is found to be a carcinoma, the patient's safety demands a complete gland dissection, so soon as glandular enlargement can be detected in the axilla or in the supratrochlear gland of the affected side. Mr. Handley even contends that precaution is wise even in cases where the glands are normal to palpation, though it cannot then be so strongly urged. The object of his operation is to cut the main line of dissemination at an early age.

In an article entitled A Pioneer Roentgenologist (Eugene Rollin Corson, M.D.), I published (Amer. Jour. Roentg., 1931, xxvi., 759) the following testimony of Dr. Corson's experience:—

"While Dr. Corson was preparing his paper on the normal movements of the carpal bones, a work not previously done, the exposure before the fluoroscope, after a long delay of 10 years, showed up with epitheliomata on the four fingers of his left hand, three of which were subsequently amputated. At the earnest advice of Prof. Halstead, of the Johns Hopkins Hospital, he had all the lymph glands removed from the axilla, and he feels assured that this timely operation has prevented the spread of the malignancy. He would earnestly advise all sufferers from over-exposure to adopt this radical measure.

"The loss of his fingers debarred him from further surgical practice. He firmly believes that had his co-workers at that time (and he has in mind especially his friend, Dr. E. W. Caldwell, whose early death was an irreparable loss to our profession), who have since given their lives to science, had had the advantage of this early radical treatment they might still be among us to-day."

Undoubtedly Mr. Handley's advice is excellent. It is to be hoped that rontgenologists who may suffer malignant changes upon the hands will have the courage to submit to this radical procedure promptly and early. Dr. Corson is still alive and well. His operation occurred about 1906.

I am, Sir, yours faithfully,

Kansas City, Missouri, May 1st.　E. H. SKINNER.

DISCLAIMERS

Mr. A. R. PATTISON writes: "In its issue of May 10th the *North Mail* published a laudatory article in extravagant phrases, referring to the work of the neurological surgeon at the Newcastle General Hospital. No name was mentioned; but it must have been obvious to anybody remotely acquainted with the facts that this article referred to me. The harmful effect of the article has been aggravated by the fact that certain charges for maintenance, which are made from time to time by the hospital authorities, have been quoted in a sensational manner as representing my customary fees. I should like to state emphatically that this article was published entirely without my knowledge or consent. I should be obliged if you would publish this disclaimer in the usual manner."

Mr. ALECK BOURNE, F.R.C.S., writes: . "My attention has been drawn to a paragraph in the lay press of May 4th which implies that I am a 'super-specialist' (whatever that may mean) in a small corner of obstetrics. I have never claimed such a doubtful distinction, it is an absurd untruth, and the paragraph was inserted without my knowledge."

UNITED STATES OF AMERICA

(FROM AN OCCASIONAL CORRESPONDENT)

FREE TREATMENT FOR EX-SOLDIERS

THE powerful "veterans' lobby" at Washington has won another victory and in doing so has overcome the still popular influence of President Roosevelt. The latter, faithful to his pre-election pledges, had vetoed the Independent Officers' Appropriation Act for the year 1935. This legislation, carried by the necessary two-thirds majority in both houses of Congress over the President's veto, involves an increased expenditure by the Veterans' Administration of $83,000,000 annually. Any veteran not dishonourably discharged who suffers from any disease, disability, or defect (whether war-connected or no), and who makes a statement under oath that he cannot pay for the treatment of same, will receive free treatment and hospitalisation or domiciliary care through the Veterans' Administration. Various other privileges are also restored to ex-combatants, both of the World War and of previous wars in which the United States has engaged. As I have previously reported, medical care is now available to all indigent persons through the provisions of Regulations No. 7 of the Federal Emergency Relief Administration. The latter regulations also provide for nursing care in the home when necessary, but make no provision for hospitalisation. The superior facilities of the Veterans' hospitals will doubtless attract to them the ailing veterans and so the practising physicians of this country will lose the fees to which they would have been entitled under Regulations No. 7.

THE PERIODIC MEDICAL EXAMINATION

The idea of a periodic examination for the apparently well is believed to have originated with Dr. Horace Dobell in England.[2] It was advanced by Dr. George M. Gould in this country in 1900. But it was not until several years later that the Life Extension Institute was founded and began to popularise the idea. The organised profession of medicine has never become reconciled to certain features of the service offered by this institute, but in 1922 the periodic examination idea was blessed and formally adopted by the American Medical Association. For 12 years its advocacy has been orthodox doctrine. Now, however, a State medical association —that of Massachusetts—has put on record its condemnation of the practice. For it they would substitute early consultation for every trivial symptom. This admittedly would detect such diseases as diabetes and pulmonary tuberculosis at a somewhat later stage than they are detected by routine exmination of the apparently healthy. Moreover, early consultation still leaves the doctor a practitioner of curative rather than of preventive medicine, whereas the routine examination, as the New York Academy of Medicine points out,[3] educates the public to look upon his medical adviser as a steady mentor for every member of the family, and not merely as a consultant in the emergencies of disease. There is no denying, however, that the great majority of doctors in this country show no disposition at present to adopt the rôle of steady mentor to those who do not complain of being unwell.

IRELAND

(FROM OUR OWN CORRESPONDENT)

UNIVERSITY REPRESENTATION IN THE IRISH FREE STATE

UNDER the constitution of the Irish Free State each of the universities in the country at the time the constitution was adopted became entitled to elect three members to the Dail. The electorate of the National University of Ireland contains the names of between 4000 and 5000 voters, that of Dublin University a little over 3000. A graduate has the option of voting either in his university constituency or in his local constituency, but he has not a dual vote. The number of votes required to elect a member for the university is very much less than is required in an ordinary constituency, and this fact has raised the objection that graduates have a special privilege not possessed by the ordinary voters. The present government accepts this view, and has introduced in the Dail and carried through its second reading a Bill to abolish university representation. As the government refused to leave the measure to the free vote of the House, it will no doubt pass the Dail, but its journey to the statute-book may possibly be delayed by the Senate. In any event it only comes into operation at the first general election after it becomes law. It is not denied that the members hitherto returned by the universities have given useful service to the State. In particular the medical profession is likely to regret the disappearance of the university franchise, for since 1918, first at Westminster and later at Dublin, the University of Dublin has consistently returned one medical man among its representatives. There is no doubt that the universities, both in Great Britain and in Ireland, can and do send into public life men of a type which would be unlikely to be chosen by the ordinary constituency.

CHILD GUIDANCE COUNCIL.—This council offers two fellowships, each of £300 tenable for a year, for half-time work at the London Child Guidance Clinic. Particulars will be found in our advertisement columns.

TRANSFER OF HEATHERWOOD HOSPITAL, ASCOT.—The London County Council has been approached to take over the hospital for surgical tuberculosis in children built by the United Services Fund in 1922 for the assistance of ex-Service men and women. The hospital, which lies near Ascot, on the London-Reading road, provides beds for 136 children on a site 55 acres in extent, the original mansion being used as resident quarters for doctors and nurses, and there is ample space for extension. The L.C.C. was expecting to take over the hospital in 1938, but in view of the pressing need for economy on the part of the United Services Fund has agreed to do so at the end of next September.

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[2] See Bauer, W. W., Progress in Periodic Health Examination, A.M.A. Bulletin, March, 1934, p. 40.

[3] The Health Examiner, December, 1933.

OBITUARY

FRANCIS SEYMOUR KIDD, M.Ch. Camb., F.R.C.S.

LATE SURGEON TO THE LONDON HOSPITAL

THE death occurred on Saturday, May 12th, at his country house at Barton Stacey, Hampshire, of Mr. Frank Kidd, the well-known surgeon and urological specialist. Although he was only 56 years of age, the event was not unexpected as his breakdown in health had been prolonged.

MR. FRANK KIDD

[Photograph by Gee

Francis Seymour Kidd, widely known as Frank Kidd, was one of the younger members of the large family of the late Dr. Joseph Kidd of Blackheath. He was educated at Winchester and Trinity College, Cambridge, and graduated with honours in the Natural Sciences Tripos, taking later the degrees of B.Ch. in 1903 and M.B. in 1905. He completed his medical education at the London Hospital, where he held a surgical scholarship and where he afterwards filled the house appointments and became demonstrator of anatomy and surgical registrar. He did some post-graduate work at Berlin, proceeded to the M.Ch. degree and the English fellowship and this was followed by election to the staff of the London Hospital.

The direction of his special interest was almost at once indicated by the publication of a book on urinary surgery in 1910. At the time that this book appeared few outside a particular circle were aware of the progress that had been made in the surgery of the urinary organs, and Kidd's book drew pointed attention to the great advances made during the ten years previous to its publication which were manifested both in diagnosis and treatment. It was a chronicle of new knowledge, made by a man intimately associated with its development. During those ten years the technique for catheterisation of the ureters had been simplified, allowing an estimate of the physiological power of each kidney to be made more readily; at the same time bacteriological research associated with the urinary tract had added to the knowledge of the infections of this system, while the introduction of the X rays for the detection of calculi in the kidney, ureter and bladder was increasing in a practical manner the surgeon's capacity of diagnosis. The great developments of the surgery of the prostate now followed, and all these aspects of urology up to date Kidd described in a book which was also excellently arranged and easy to read. He obtained, and rightly, a very large consulting and operating practice, and from time to time wrote out his experiences in an informing manner in the columns of the medical journals and in well-known compilations and encyclopædias. His clinical records, though numerous, were never made without reason—they always contained a lesson. For example, in describing the case in our columns of the largest calculus which he had ever removed from the pelvic portion of the ureter—the stone measured 2¼ in. in the long diameter and 1 in. in the short diameter (see THE LANCET, Jan. 17th, 1920, p. 151)—he noted the absence of preliminary indications of the condition, and concluded from his own work that as a general rule the larger the stone the fewer the symptoms; a practical hint of the first importance. Similar references to medical literature throughout a long period might be given in testimony of Kidd's surgical judgment, operative dexterity, and also to his wide reading. For instance, as president of the section of urology of the R.S.M. he delivered an address on purpura of the urinary tract (vide THE LANCET, May 5th, 1928) in which the difficulties of diagnosis were analysed and the ætiology and treatment discussed in reference to a series of illustrative cases. The address introduced the audience to much new bacteriological and technical knowledge, while its practical message was to give reasons for the fact that urologists had often been led to remove the kidney on suspicion of non-existent neoplasms, whereas neoplasms of the kidney are both comparatively rare and when present do not form a common cause of hæmaturia. While still assistant surgeon to the London Hospital he took charge of a genito-urinary department at the hospital. He became full surgeon to the institution some 15 years ago, and was also surgeon to St. Paul's Hospital for diseases of the genito-urinary organs and skin, where much of his operative work was done.

Mr. Frank Kidd married Stella, daughter of the late Mr. W. Williams, of Langland, and leaves three sons. He had been, when at Winchester, a prominent footballer, and later obtained his University blue for hockey and became a member of the English team in some international contests.

MEREDITH YOUNG, M.D. Edin., D.P.H.

LATE M.O.H., CHESHIRE COUNTY

WE regret to record the death of Dr. Meredith Young which occurred at Chester on May 7th at the age of 64.

Meredith Young was born at Waterloo, Liverpool, the son of the Rev. James Young, and was educated at Bradford Grammar School and at the University of Manchester, completing his professional training in Edinburgh. He graduated as M.B., C.M. Edin. in 1892, taking honours in a series of subjects, and immediately entered the public health service. From 1892 to 1897 he was M.O.H. for Brighouse, during the next three years he acted in the same capacity at Crewe, from 1900 to 1908 he was M.O.H. for Stockport, and then, following a year of service as M.O.H. for the metropolitan borough of Marylebone, he became M.O.H. for Cheshire, a post which he held for 25 years, retiring in 1932.

In the course of filling these appointments Meredith Young proceeded to the M.D. Edin., and took a public health diploma at the University of Manchester and also in London, while in 1907 he was called to the Bar of Lincoln's Inn. Out of his great experience he found that he had the material for much informative authorship and lecturing. He wrote on the clinical and public health aspects of small-pox, on the control of common lodging-houses in the *British Medical Journal*, and on the methods of treating infective conditions of the throat in *The Lancet* and *The Practitioner*, while in 1916 he published an extension of lectures delivered in a special course of

The Cambridge Graduates' Medical Club

The annual dinner of this club was held at the Langham Hotel, London, on Wednesday, May 9th, with the president of the club, Dr. H. Morley Fletcher, presiding. Although the rule of the club admitted no speeches, the president broke the rule by telling the guests in a few words that this was the fiftieth dinner of the club, and took occasion to make some interesting references to its past history. At the close of the dinner Prof. Langdon Brown proposed Dr. Morley Fletcher's health.

University of London Medical Graduates' Society

The annual meeting of this society was held at the Langham Hotel, London, on May 8th. Mr. W. McAdam Eccles was elected president, Sir Charlton Briscoe honorary treasurer, and Mr. W. E. Tanner joint honorary secretary. At the dinner which followed, Sir Henry Brackenbury was the guest of the evening and the retiring president, Lady Barrett, replied to the toast of the society.

Longer Training for Blind Masseurs

The course for blind students at the massage school of the National Institute for the Blind is to be extended from 18 months to two years. The extension is considered necessary because of the wide range of subjects taught which now include massage, remedial exercises, and medical electricity.

Diet in Hotels at a Spa

A scheme has been evolved at Bath whereby visitors requiring special diet will receive a card from their physician which they will hand to the head waiter or manager of their hotel, who will then see that the instructions are carried out. The names of dishes and drinks to be avoided will be deleted from the list.

East-End Maternity Hospital

The clinical report of this hospital, which is in Commercial-road, states that last year there were 1403 in-patients and 369 out-patients, a total of 1772; there were no maternal deaths. There was one case of eclampsia and one requiring Cæsarean section.

The Guardianship Society

This society, which has its headquarters at Brighton, has now been in existence for 21 years. Its work for the care and the supervision of the mentally and physically defective is well known, and no fewer than 84 public authorities are now invoking its assistance. In 1933 there were 1077 patients on the books, and in addition 170 cases were visited voluntarily, helped, or advised. Besides this after-care work the society has for nine years maintained a clinic for nervous disorders with Dr. G. H. Harper-Smith as mental specialist, where 65 new patients have attended during the year.

A Visit to a Wild Flower Sanctuary

The Green Cross Society which, as already announced (March 24th, p. 662), is organising a visit to Norway for the study of wild flowers, informs us that the start from Newcastle-on-Tyne has been postponed until July 14th, to suit the convenience of the Norwegian botanists, Dr. E. Christophersen and Mr. Johs. Lid, who are to guide the party. Ample opportunity is offered for the exploration of sanctuaries where rare plants have survived from the ice age. The inclusive cost of the ten days' trip, Newcastle to Newcastle, is 20 guineas, or 14 guineas for any willing to travel third class from Newcastle to Bygdin via Oslo.

British Institute of Radiology

The annual general meeting of this institute will be held on Thursday, May 31st, at the hall of the institute, 32, Welbeck-street, London, W., at 8 P.M. Mr. H. A. Edgerton will read a paper on the measurement of X ray quality by a photographic method and Mr. A. J. Minns one on the technical aspects of short-wave therapy.

A medical meeting will be held on Friday, June 1st. A visit will be paid to the Cancer Hospital, Fulham-road, London, S.W., at 11 A.M., and at 5 P.M. Dr. J. V. Sparks will give a short communication on radiographic demonstration of calcification in cardiac valves. A series of paper films by Dr. Sparks with special reference to chest cases will be on view at the institute on Thursday and Friday, and members are invited to report their experiences with paper negatives.

Public Health Services in South Africa

During the debate on the Budget in the Union House of Assembly, Capetown, on April 17th, Mr. Jan Hofmeyr, the Minister of the Interior, made a statement on the public health services of the Union. These services have lately been largely curtailed, but are now not only to be restored but largely extended. Mr. Hofmeyr outlined among other things a campaign against tuberculosis embracing the establishment of subsidised clinics in all the larger towns, the enlargement of the Nelspoort Sanatorium to serve the whole Union, and hospital provision for advanced cases. The scheme is of particular interest to the Transvaal, where 50 beds at the Springkell Sanatorium are being placed at the disposal of the health department, and where accommodation is being provided for non-European cases at Rietfontein. The Minister's new policy makes provision for the welfare of the native and coloured people, and a fact-finding commission is to be set up. At the same time native medical "aids" are to be trained and appointed to combat the excessive infantile and maternal mortality in the Union.

Royal Medical Benevolent Fund

During the first quarter of this year £3674 has been voted in grants as against £3489 during the corresponding period of last year. The following are particulars of a few cases recently helped.

M.B., aged 47, married, daughter age 10. On leaving the army after the war, the applicant had no practice to return to, and having developed disseminated sclerosis he was not capable of undertaking the medical work of an arduous practice. A county council in August, 1930, appointed him medical officer, in which post he made a great effort to carry on. His condition did not improve, and finally he had to resign in August, 1933. He has a pension of £100, and his wife's private income is £20. Fund voted £10 in four instalments for a period of one year.

Widow, aged 32, of M.B. Her husband served abroad and died from tuberculosis at the age of 33 in February, 1934, leaving the widow and two children, a boy of 7 and a girl of 5. The widow is entitled to a pension of £60 and allowances for the children of £45. A life policy when invested will yield £35. Her total income is £140. No relations can help. Fund granted £26 in four instalments over a period of one year.

Daughter, aged 69, of M.R.C.S., has been working for her living for over 30 years. She and a cousin ran a boarding house up to two years ago when they had to give up owing to local competition. They moved to a smaller house with a view to taking lodgers. Only a little money is now earned. The cousin has the old age pension of £26 but the applicant is not eligible till next year. Fund grant £26 in four instalments over a period of one year, and is endeavouring to get other assistance for these two ladies.

Cheques should be made payable to the hon. treasurer of the fund, 11, Chandos-street, Cavendish-square, London, W.1.

National Association for the Prevention of Tuberculosis

The twentieth annual conference of this association will be held in the County Hall, Westminster Bridge, London, S.E., on June 14th and 15th under the presidency of Sir Robert Philip, and will be opened by Sir Hilton Young, the Minister of Health. The conference will take the form of an all-round discussion on the national tuberculosis scheme, and it will consider the national system of combating tuberculosis which was inaugurated by the report of the departmental committee on tuberculosis (1912–13). The first address will be given by Lord Astor, who was chairman of this committee. Other speakers at the opening session will be Dr. A. Salusbury MacNalty, senior medical officer of the Ministry of Health, Dr. N. D. Bardswell, principal assistant medical officer to the London County Council, and Sir John Robertson, professor of public health in the University of Birmingham. In the afternoon the discussion will be mainly concerned with the *tuberculosis dispensary* and the speakers will be Dr. G. Lissant Cox, central tuberculosis officer of the Lancashire county council, and Dr. Melville Dunlop, of the tuberculosis department of the University of Edinburgh. At 10 A.M. on June 15th the discussion will be continued and will deal with residential institutions. The speakers will include Dr. James Watt, Dr. R. C. Wingfield, Dr. J. B. McDougall, and Dr. F. R. G. Heaf. The names of delegates and private members who wish to attend should be sent as soon as possible to the secretary of the association, Tavistock House North, Tavistock-square, London, W.C.1.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

Unemployment Bill

On May 14th in the House of Commons Sir H. Betterton (Minister of Labour) moved the third reading of the Unemployment Bill.

Mr. Lawson moved :—

"That this House declines to assent to the third reading of a Bill which removes from Parliament its direct responsibility towards those who are denied employment as a result of the present industrial system, fails to recognise the disquieting evidence of malnutrition and to provide adequate maintenance for the unemployed and their dependents, confirms and perpetuates a vicious means test originally imposed as a temporary expedient, throws upon a section the burden of a debt which should be borne by the whole community, and, by exacting a contribution from local authorities in aid of a national service, inflicts hardship upon areas where, through national neglect, industry has been allowed to decay."

After debate, the motion for the rejection of the Bill was negatived by 421 votes to 67 and the Bill was read the third time.

Road Traffic Bill

The Road Traffic Bill was further considered by a Standing Committee of the House of Commons on May 8th.

Mr. Stanley said that although he had great confidence in the effect of the speed limit he did not claim the knowledge of the future and the absolute certainty of those who opposed the clause and said that it was bound to fail altogether. He was prepared to face the possibility that it might prove a failure. If it should prove a failure it would be better that it should be allowed to lapse rather than that it should be allowed to drag on a miserable existence years after it had been found to be unsuccessful. But three years was too short a time in which to bring the speed limit into force and to map out the areas to which it should apply, and if the mover of the amendment would agree to make the experimental period one of five years ending in 1939 he would be prepared to accept it.

Lieut.-Colonel Moore-Brabazon agreed to this suggestion, and the amendment making the speed limit applicable to the end of 1939 was agreed to.

When a general discussion on the speed limit in the built-up areas and on the definition of those areas took place, Sir E. Graham-Little said he hoped that the Minister would not be put off his intention to use every possible likely device to decrease the toll of accidents. He particularly deprecated any suggestion that they ought to wait and see the effect of one process and then try another process and so on. Speaking as a medical man, he would ask the members of the Committee who had raised such suggestions whether, supposing they were desperately ill, they would accept the suggestion from a physician that they should try one remedy and see how it worked and then try another instead of trying everything that medical science could suggest. He hoped that the speed limit would not be entirely at the mercy of Orders, but that there would be some definite settled principle which would be maintained.

DOCTORS AND THE SPEED LIMIT

In the House of Commons on May 15th, in considering Clause 3 of the Road Traffic Bill which proposes to give exemption from the speed limit to vehicles used for fire brigade, ambulance, or police purposes, Mr. T. Smith proposed an amendment extending similar exemption to cars used by medical men. He said that the purpose of the amendment was to meet the needs of doctors who were summoned to urgent cases.—Mr. Llewellyn Jones said he thought that the result of the proposed amendment might be that any doctor would be able to exceed the speed limit at any time and set up the defence in the event of a prosecution that he was on his way to an urgent case.—Mr. Oliver Stanley (Minister of Transport) said that he could not recommend the Committee to accept the amendment, although he quite appreciated the purpose in view. He had tried to find some way in which this matter could be met, but he had found great difficulty. It would be quite impossible for the police to detect, when a car was going along the road, whether a medical man was going to an emergency case or not. The exemption proposed in the amendment might relieve a doctor from a prosecution, but he might be delayed by the police and everyone was anxious to avoid delay in cases of emergency.—Mr. Grenfell suggested that the matter might be met by doctors being allowed to carry distinctive marks on the roads.—After further discussion, the amendment was withdrawn.

HOUSE OF COMMONS

WEDNESDAY, MAY 9TH

Verminous Houses in Sheffield

Mr. Hamer Russell asked the Minister of Health whether he was aware that the medical officer of health of the city of Sheffield, although possessing abundant evidence of bug-infested property, had no power to eradicate this nuisance, and that alternative accommodation could not be sanctioned for the tenants concerned on the ground that the property was not slum property; and whether, in view of the danger to public health arising from the existence of bug-infested property, he would make investigations and, if advisable, issue compulsory orders.—Mr. Shakespeare, Parliamentary Secretary to the Ministry of Health, replied: Under Part IV. of the Public Health Act, 1925, which is in force in the city of Sheffield, the corporation have power to secure the cleansing of verminous premises, and when this is done it is not necessary to provide alternative accommodation. My right hon. friend will be glad to make inquiries about one case, which my hon. friend has brought to his notice, in which it is suggested that cleansing is impossible owing to the nature of the premises infected.

THURSDAY, MAY 10TH

Female Officers in Prison Service

Colonel Goodman asked the Home Secretary how many appointments to matronship had been made from candidates outside the prison service during the last two years to the nearest convenient date; the number of applicants for each of the posts from established female officers; and if in future appointments he would take into consideration the experience gained by years of contact with all classes of female prisoners on the part of existing female officers.—Sir John Gilmour replied: During the two years ended 30th April ten appointments were made to the post of matron in male Borstal institutions, seven of them being filled by persons from outside the prison service and three by prison officers. In the course of making selections for these appointments thirteen applicants from among prison officers were considered. The qualifications and experience of such officers are always taken into account, but service in a women's prison is not necessarily a qualification for the very different work of matron in a Borstal institution for boys and young men.

Infant Mortality in Kensington

Mr. James Duncan asked the Minister of Health (1) if he was satisfied that the steps taken to deal with infant mortality in Kensington were adequate, and (2) what steps were being taken by the Kensington borough council to reduce the infant death-rate in North Kensington.—Sir Hilton Young replied: I am informed that the subject of infant mortality in Kensington has at all times received careful attention and study by the borough council and has recently been the subject of a special investigation by them. The council have provided a comprehensive maternity and child welfare service, which

NOTES, COMMENTS, AND ABSTRACTS

NUTRITION

AN AGREED STATEMENT ON BASIC REQUIREMENTS

In its report on the minimum cost of a sufficient diet, issued last November, the British Medical Association's committee on nutrition adopted a scale of calories and first-class protein which was higher than that laid down by the committee which advises the Minister of Health. The difference gave rise to comment, and the Ministry issued a statement to local authorities stating that its committee saw no reason to modify the advice it had given (see THE LANCET, Jan. 13th, 1934, p. 87). The points at issue have since been discussed by a conference of representatives of the two committees,[1] and the following report has now been issued by the Ministry, signed by Sir Gowland Hopkins (chairman), Prof. Cathcart, Prof. Cowell, Dr. Crowden, Prof. Mellanby, and Prof. Mottram.

The Report

The business before the conference was to consider whether any important differences existed between the recommendations of the Ministry's Committee, as stated in their Memorandum "The Criticism and Improvement of Diets," and those of the British Medical Association's Committee, as outlined in their special Report on Nutrition, and if so, to determine the significance of such differences.

After examination of the position it became clear to the conference that the divergencies were more a matter of misunderstanding and misinterpretation than of actual fact.

In the first place it is desirable for a proper understanding of the position that the nature and objectives of the two Committees should be made clear.

The Ministry's Committee is a permanent advisory body first appointed in January, 1931, by the then Minister of Health, Mr. Arthur Greenwood. The duties of the Committee are to advise the Minister on the practical application of modern advances in knowledge of nutrition. The Committee consists of workers with a special knowledge of nutrition, who, as occasion demands, place their scientific knowledge at the disposal of the Minister and his staff to assist him and his department in administrative action. It does not possess any authority, nor does it attempt to give advice on economic matters. In their memorandum "The Criticism and Improvement of Diets," the Committee recommended 3000 calories and 37 grammes of first-class protein, or thereabouts, as adequate to supply the needs of the average "man" of the entire population of the country. *These recommendations were intended as a rough guide to medical officers of health so as to assist them in placing the nutrition of communities and institutions under their charge on a proper basis.* These values, being statistical averages, were meant to be applied to whole communities and not to individuals or even to single families. It is in this respect that the purpose of their recommendations differed most markedly from those published by the British Medical Association's Committee.

It is necessary also to point out that the responsibility for these and other recommendations made by the Advisory Committee belongs to the members of the Committee entirely and not to the Ministry of Health; and further, that in the above-quoted memorandum no recommendations of an economic nature were put forward.

The British Medical Association's Committee, on the other hand, is not a permanent body, but was a special ad hoc committee assembled for a specific purpose, "to determine the minimum weekly expenditure on foodstuffs which must be incurred by families of varying size if health and working capacity are to be maintained, and to construct specimen diets."

The terms of reference thus involved a task of a financial nature, but in order to discharge this the Committee had to decide on the food allowances necessary to maintain health and working capacity. In coming to a decision they thought naturally of unemployed men and their families and bore in mind that many unemployed spend a good deal of their time working on allotments, going to and from labour exchanges and places of employment in search of work, or else in keeping themselves in good physical condition by daily exercise in training centres. And since the food requirements of the individual depend on the amount of physical exercise taken, the Committee felt justified in recommending 3400 calories and 50 grammes of first-class protein per "man equivalent" as essential to maintain the health and working capacity of a family of this type. The Committee regarded these figures as sufficient to cover a wastage of 10 per cent., but did not suggest that they should be applied to the population as a whole or even to communities or institutions. It can thus be seen that, whereas the British Medical Association's Committee confined their attention to single active families, the Ministry's Committee had in view communities of people many of whom lead comparatively inactive lives.

CALORIES

The conference considers it important to emphasise the fact that nutrition and dietetics, dealing as they do with physical and chemical changes inside the body, most of which are imperfectly understood, cannot be considered exact sciences. The calorie is merely a convenient unit for measuring the energy-content of food and the energy-output of the body. Furthermore, it must be clearly recognised that owing to individual differences in physique, personal habits, likes and dislikes, and the variations in the degree of muscular effort involved in different occupations, it is not only impossible to define, but also there does not in fact exist, any standard of food requirement which can be rigidly applied to all men alike. If such a standard were defined and universally applied, it would at once be found that, while some individuals were satisfied, others would have either too much or too little. The amount of physical work, housing conditions, clothing, climate and personal characteristics are factors influencing the need and desire for food which have to be considered when dealing with individual men.

It appears, therefore, that a workable solution of the problem of physiologically desirable dietary standards for individuals can only be found in a sliding scale of calorie needs based on age, individual physique, occupation, and habits. On the other hand, in the case of mass calculations of the total food requirements of the population as a whole, where the question of distribution to individuals or purchasing by single families does not arise, or in the case of communal feeding, the difficulty of the standard ration being suited to the needs of each individual is largely overcome by the give and take in the food demands of the various individuals making up the community.

It is indeed a fact that, while certain limited classes of men need well above 3400 calories per day, others need less than 3000, and therefore the sliding scale of calorie needs now put forward by the conference has been constructed in the hope that it may provide authorities with a satisfactory working basis on which to determine the needs of individual men and families of varying composition. Such a sliding scale should not, however, be interpreted in too rigid a sense, for the unique nature of each individual's food requirements cannot be too strongly emphasised. The sliding scale adopted by the conference is shown below :—

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[1] The following members took part in the proceedings: Prof. E. P. Cathcart, M.D., F.R.S., Sir F. G. Hopkins, F.R.C.P., P.R.S., Prof. E. Mellanby, F.R.C.P., F.R.S. (representing the Minister's Advisory Committee); Prof. S. J. Cowell, M.R.C.P., Dr. G. P. Crowden, Prof. V. H. Mottram (representing the B.M.A. Committee); Dr. G. C. Anderson, and Dr. H. E. Magee (joint secretaries). The report is issued by the Ministry of Health and is obtainable from H.M. Stationery Office, price 2*d*.

SLIDING SCALE OF CALORIE REQUIREMENTS PER DAY

Individuals	Calories gross.	Individuals	Calories gross.
Man : heavy work	3400–4000	Child : 12–14	2800–3000
,, moderate work	3000–3400	,, 10–12	2300–2800
,, light work ..	2600–3000	,, 8–10	2000–2300
Woman : active work	2800–3000	,, 6–8	1700–2000
,, housewife	2600–2800	,, 3–6	1400–1700
Boy : 14–18 ..	3000–3400	,, 2–3	1100–1400
Girl : 14–18 ..	2800–3000	,, 1–2	900–1100

The conference also agrees that the all-round average requirements of the entire population or of large mixed groups of people at the present time is about 3000 calories per day. This figure can safely be employed for calculations of mass requirements, but, in the case of individuals, and single families, due regard should be paid to the sliding scale detailed above.

Of as great significance to health as calories are the proteins, minerals, and vitamins in the foodstuffs which go to build up the tissues of the body. Because of the special needs associated with the growth and development of new tissue, proteins, minerals, and vitamins are particularly important for children and expectant and nursing mothers.

PROTEINS

The general statements recited in regard to standards in respect of calorie requirements apply also to the needs of individuals, families, and communities for protein. Accumulated evidence indicates that the total daily need for protein per man unit probably lies between 80 and 100 grammes, that is, from $2^{4}/_{5}$ to $3\frac{1}{2}$ ounces. The precise amount of protein needed by any particular individual depends on physique, occupation, habits, personal tastes, and age, while climate appears also to be a factor of some importance. There is a general consensus of opinion that a certain proportion of the total protein should be in the form of first-class protein—i.e., protein of animal origin such as milk, eggs, cheese, meat, or fish. The desirable proportion of animal protein to total protein has, so far as our knowledge goes, never been exactly determined ; but we are convinced from the evidence which is available that the growing child and the expectant and nursing mother require relatively large amounts of first-class protein, much more indeed than would be arrived at by simple calculation based on their man-value equivalents.

All recent studies on the nutrition of children have shown that milk is for them a most valuable food. It is indeed the only naturally balanced food we know of, containing as it does in readily available form not only first-class protein (18·7 grammes or $\frac{5}{8}$ oz. to the pint), but also minerals, vitamins, carbohydrate, and fat. The conference therefore desires to stress the importance of this highly nutritious food for the child and the nursing and expectant mother. Both the Ministry's Committee and the Committee of the British Medical Association were mindful of these facts in regard to the special needs of the child, and both stressed the importance for children of the provision and consumption of milk in adequate quantities.

In the case of the adult the conference is of the opinion that a diet to be reasonably adequate should always contain a proportion of protein of animal origin : and that on the basis of accepted dietaries, which have stood the test of practical experience, this proportion should not be lower than one-third of the total protein consumed, and may perhaps with advantage be increased to a half.

In applying these recommendations to individuals it must be remembered that in the case of both children and adults the foregoing statements are generalisations, which may well be qualified by individual tastes and variations, and, moreover, it should be pointed out that all proteins of animal origin do not necessarily possess the same nutritional value.

NO FUNDAMENTAL DISAGREEMENT

The members of the conference deplore the exaggerated importance which has been attached to the alleged disagreement between the two committees, and wish to avail themselves of this opportunity of stating that there did not exist, nor does there exist now, any fundamental disagreement on matters of scientific fact between the two bodies.

In conclusion it may be said that it is the earnest hope of the conference that these recommendations will prove of practical value to local authorities and others, and will enable them to place the nutrition of those under their charge both individually and collectively on a sound basis, in the interests of the health, fitness, and well-being of the nation.

PHOSPHORUS AND RICKETS IN SHEEP AND LAMBS

WHILST experimental work upon mineral deficiency in laboratory animals has been carried out for many years, the study of this deficiency in farm animals has developed comparatively recently. H. Müller (1873), F. Roloff (1860), and other early German workers realised the dietetic importance of phosphorus and calcium ; their work, however, was overlooked and the subject of mineral metabolism was only reopened, on a serious scale, in the course of research work upon botulism. During experiments designed to establish the ætiology of "lamsiekte," a disease of cattle in South Africa, information rapidly accumulated regarding the influence of phosphorus upon the development and health of domestic animals. The history of the study of aphosphorosis in ruminants has been summarised[1] by Sir Arnold Theiler and Mr. H. H. Green, D.Sc. For many years it was considered that sheep, under natural conditions, did not suffer from mineral deficiency diseases ; more recently it has been found in South Africa, Northern Europe, and elsewhere, that if the phosphorus deficiency is sufficiently severe osteomalacia does occur. Sir Charles Martin and Mr. A. W. Pierce, B.Sc., in a recent publication—the first of a series[2] entitled Studies on the Phosphorus Requirements of Sheep—describe experimental work carried out in Australia. A group of four ewes and five lambs were kept for eleven months on a diet adequate in proteins and vitamins, but containing only 0·6 g. of phosphorus per day, whilst control animals received 1·6 g. of phosphorus. It was found that the deficient group became fatigued rather rapidly, but, except for one lamb which developed clinical signs of rickets, the remainder showed no obvious differences from the controls. Analysis of the experimental data brought out the following facts. The consumption of bulky food (roughage) was considerably lower per head in the deficiency group than in the control group, whilst the gain in weight was 30–40 per cent. less. Blood analysis showed a striking fall in inorganic phosphate in the deficiency group, the fall commencing early in the experiment ; the blood calcium was higher in the deficient group by the end of the experiment than in the controls. In general the foregoing findings confirm those of the South African workers. As regards wool production no appreciable difference was found in the quantity or quality of the wool from the lambs, whereas in South Africa deficiency resulted in the growth of a decreased quantity of very fine —i.e., thin fibre—wool ; the S. African experiments, however, were carried out upon pregnant and lactating ewes suffering, in consequence, from a very severe mineral drain. The bones of the lambs in the deficiency group showed, at the end of the experiment, osteoporosis and to a lesser degree osteomalacia. One lamb developed typical rickets ; a most interesting observation, for though there are a considerable number of reports of the occurrence of rickets in lambs, in comparatively few cases has the diagnosis been confirmed histologically. Also, this lamb lived under conditions very similar to nature, receiving adequate food (except phosphorus), vitamins, and sunlight, whereas most cases previously reported have been associated with an abnormal lack of sunlight.

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[1] Nutrition Abstracts and Reviews, 1932, i., 359.

[2] Council for Scientific and Industrial Research, Commonwealth of Australia. Bulletin No. 77, pp. 44.

LINES TO A G.P.

THE following lines in which neat versification blends wit and serious thought have been extracted, with thanks, from the April issue of the *St. Mary's Hospital Gazette :*

He's a general practitioner,
Sidesman and missioner,
And in addition a
First-rate physician, a
Man of decision, a
Great reconditioner.
By general admission a
Leading parishioner.

He's just a G.P.
With a minor degree,
And patients he'll see
At a very small fee.
But his slightest decree
Rules the whole family.
You can take it from me,
They daren't disagree.

He's the family adviser,
There's nobody wiser.
At birth or demise a
Successful deviser
And kind sympathiser.
Who could deny, Sir,
A gift from the sky, Sir,
To help you and I, Sir!

BOYS' CLUBS

HIS daily contact with a well-known Jewish Club—The Bernhard Baron Settlement—has given Mr. Henriques a unique opportunity for studying the personality of the young members of a large city, let loose after school and working hours in unattractive, insalubrious, and often mentally unsatisfactory surroundings. He has set out the results of his experience in a little book[1] full of interesting facts on club management, and still more interesting facts about club members, their mental attitude, aspirations, and difficulties. From the psychological point of view, the chapters on leadership, religion, and sex are the most outstanding. Perhaps in later and expanded editions more space will be given to these vital topics. But even in its present form this readable handbook ought to be in the hands of any physician whose work brings him into contact with social situations which throw a light upon neurosis and delinquency.

CONTRACEPTIVE METHODS

WE have received from Mr. Cecil C. B. Voge, Ph.D., B.Sc., F.R.S. Edin., a questionnaire directed to obtaining accurate information with regard to results of the methods employed in the use of contraceptives. Mr. Voge is, as some of our readers may know, the author of a book on the chemistry and physics of contraceptives in which the action of pure chemicals on the life of the spermatozoa is reviewed and in which much information with regard to proprietary contraceptive compounds is supplied. He has recently formed a museum in the department of public health of the London School of Hygiene and Tropical Medicine (vide THE LANCET, Jan. 21st, 1933) with the object of dealing with various aspects of a multi-sided subject.

The questionnaire on contraception consists of two forms, one for the medical profession and the other for lay persons. In form I. these pertinent questions are asked: the age on marriage of each patient, the number of pregnancies, miscarriages, abortions, or stillbirths, if a contraceptive method has been used and abandoned, and if abandoned, why? The practitioner is asked to state also the particular methods which he has recommended and which of them he prefers. In form II. the age on marriage of the subject is asked, the number of children living or dead, and the number of miscarriages and stillbirths, and details with regard to sexual life are invited; and it is inquired whether the employment of any birth control method has prevented pregnancy or borne any relation to sex satisfaction. If the reasons for failure of the method, the trade name of which should be supplied, can be ascertained, they should be given.

The forms can be obtained from "Consulting Chemist" 2, Gray's Inn-road, London, W.C.

"CHINESE MEDICINE."—Messrs. H. K. Lewis inform us that the price of this book, by Dr. W. R. Morse, reviewed in our issue of May 5th (p. 962), is 7*s.* 6*d.*

Messrs. EDWARD ARNOLD & Co. write: "It has been pointed out to us by Dr. William Brown that certain phrases in our advertisements of the third edition of his book, 'Psychology and Psychotherapy' might be construed as being contrary to the accepted principles of medical ethics. In view of this we wish to make it clear that the responsibility for these advertisements rests entirely with us, and not with the author, who did not know of their contents until they were published. Future advertisements will be suitably modified."

LONDON HOSPITAL RESEARCHES.—Reprints of 31 of the papers published from the London Hospital last year are collected in a volume issued by Messrs. H. K. Lewis at 7*s.* 6*d.* Four are concerned with filtrable viruses (psittacosis and zoster), a subject in which investigation is actively pursued in the Freedom research laboratory by Dr. S. P. Bedson and his associates. Renal function in various of its aspects is considered in three papers, two of them from the medical unit, of which Prof. Arthur Ellis is director. Dr. Paul Fildes, F.R.S., and co-workers contribute four papers on the nutrition of bacteria; Dr. William Evans and Dr. Clifford Hoyle have reprints of two of their studies on the therapeutics of angina pectoris; and Dr. Hoyle is also author of three other papers, two of them on hypertension. Besides nine papers reproduced from our own columns the volume contains also Dr. Eric Skipper's review of diabetes mellitus in pregnancy, two of Dr. Dorothy Russell's contributions to the histology of cerebral tumours, and Mr. R. K. Debenham's analysis of 742 cases of hæmaturia.

Births, Marriages, and Deaths

BIRTHS

BARLOW.—On May 10th, at Welbeck-street, the wife of Surgeon-Commander N. A. H. Barlow, R.N., of a daughter.

CRAIG.—On May 4th, the wife of Dr. Nicholas Craig, Cheadle Hulme, Cheshire, of a son.

DYSON.—On May 10th, at St. Mawes, Cornwall, the wife of Malcolm Dyson, M.D., of a daughter.

FIDDIAN-GREEN.—On April 17th, at Matatiele, East Griqualand, South Africa, the wife of Dr. W. B. Fiddian-Green, of a son.

MACDONALD.—On May 7th, at Grosvenor-street, Edinburgh, the wife of James F. MacDonald, M.B., F.R.C.S.E., Northern Rhodesia, of a daughter.

SCHNEIDER.—On March 31st, at Southampton, to Dorothy, wife of Dr. J. E. Schneider—a daughter.

DEATHS

GREENE.—On May 12th, at Stratford-on-Avon, R. L. W. Greene, L.R.C.S., L.R.C.P., J.P., aged 81 years.

HALLEY.—On May 13th, at Fulham-road, S.W., William Halley, M.R.C.S., L.R.C.P., aged 71 years.

KIDD.—On May 12th, at Bransbury Mill, Barton Stacey, Francis Seymour (Frank) Kidd, Surgeon of Harley-street, W.

OGILVY.—On May 13th, at Long Grove House, Epsom, David Ogilvy, M.D.

PATERSON.—On May 11th, at Aigburth Hall-avenue, Liverpool, William Brogdon Paterson, M.B., C.M. Edin.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

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[1] Club Leadership. By Basil L. Q. Henriques, M.A., J.P. London: Humphrey Milford, Oxford University Press. Pp. 200. 3*s.* 6*d.*

ADDRESSES AND ORIGINAL ARTICLES

THE CHILDHOOD TYPE OF TUBERCULOSIS *

By Leonard G. Parsons, M.D., F.R.C.P. Lond.

PHYSICIAN TO THE CHILDREN'S AND GENERAL HOSPITALS, BIRMINGHAM; PROFESSOR OF DISEASES OF CHILDREN IN THE UNIVERSITY OF BIRMINGHAM

The childhood type of tuberculosis has been defined as "the diffuse and focal lesions in the lungs and adjacent tracheo-bronchial glands that result from the first infection of the pulmonary tissues by the tubercle bacillus," and in dealing with some of its aspects I hope to explain the apparent paradox that tuberculosis in early childhood may be both a benign and a fatal infection.

For many years it was held as an axiom in medicine that pulmonary tuberculosis in infants and young children was usually a fatal disease; in infancy, because of the rapidity of extension of caseous pneumonia and the liability to miliary tuberculosis; in childhood, because the disease is not limited to a portion of the lung by fibrosis—a process which is so characteristic of the adult type of tuberculosis—although with increasing age the child gradually develops the capacity to achieve this end. Therefore, at the one extreme of childhood there was the danger of rapidly spreading caseous broncho-pneumonia and miliary tuberculosis; at the other, the approach to the adult form of chronic pulmonary tuberculosis, and in the intermediate period the tendency to miliary tuberculosis and caseous broncho-pneumonia becoming progressively less marked. In this intermediate period the disease was regarded so seriously that, having made the diagnosis of pulmonary tuberculosis, the child's expectation of life could be measured roughly as one month for every year of its age—i.e., a child of six years had an expectation of life of only six months. This was the reason given to explain the fact that pulmonary tuberculosis is only a rare cause of chronic illness in childhood, and quite uncommon in children attending school.

Mode of Infection

The view that pulmonary tuberculosis was usually the result of inhalation of tubercle bacilli was widely held until some 25 years ago. About that time the importance of tuberculous milk in producing disease was realised, and the inhalation theory was contested so effectively by Calmette and others that in 1910 it was accepted that "air infection probably means that the bacillus enters through the mucous membrane of the throat or alimentary tract. Direct infection of the lungs is 'negligible'" (Cautley [1]). This "alimentary" view was based upon the important parts played in the tuberculosis of childhood by: first, the bovine infection of milk; secondly, the lymphatic glands. The disease appeared to arise in the lymph glands, since enlarged and caseous mesenteric glands were frequently found at autopsy or at operation and, which was even more important from the standpoint of this theory, caseous bronchial glands without any obvious lesion in the lungs were by no means an uncommon occurrence in autopsies. Infection of the bronchial glands and lungs via the alimentary tract and lymphatic system has been demonstrated experimentally, although a much larger dose of tubercle bacilli is required for infection by this route than by the air-passages. Anyone who has witnessed a post-mortem of, say, neuroblastoma of the suprarenals, will realise that the possibility of infection by this route cannot be denied; nevertheless, we can now say that the alimentary view of tuberculous infection of the bronchial glands is absolutely untenable, although infection of the lungs with bovine tubercle bacilli via the blood stream, which in its turn has been infected from an abdominal lesion, is a possibility, and actually does sometimes occur. Thus Blacklock [2] found the bovine bacillus in three instances in a series of 108 children under twelve years of age who suffered from thoracic tuberculosis.

The observations which eventually killed the alimentary theory were those published by Ghon in 1912, just at the time when the alimentary view was gaining so many adherents. Many years ago Cohnheim enunciated the law that the portal of entry of the tubercle bacillus was indicated by the fact that the lymph glands draining that area became infected, and it is now held that wherever tubercle bacilli first gain an entrance into the body a triad of changes takes place to which the name "primary complex" was given by Ranke; first, the primary tuberculous focus at the place where the bacilli lodge; secondly, a tuberculous lymphangitis spreading from the primary focus to the lymph glands draining that area; thirdly, inflammation and a tendency to caseation of these glands. Ghon showed that the primary lesion from which the bronchial glands became infected was situated in the lung, and that this primary focus was so small as frequently to be overlooked. In other words the infection was air-borne, and in his view 95 per cent. of tuberculosis occurred in this way. Such a conception explains the fact that tuberculous mediastinal glands may be found at autopsy without clinical or even obvious post-mortem signs of pulmonary tuberculosis. Ghon's work was unknown, or at any rate unaccepted, for many years; indeed, its importance has only been realised in recent times.

Epituberculosis

In the light of the doctrine that tuberculosis in early life is so fatal that, according to a leading British text-book of Children's Diseases published in 1929, "in the first year of life probably nearly all infected children die," [4] it is difficult to understand why the tuberculous process in the lung is ever limited to a Ghon's tubercle, and why the disease ever becomes arrested, but it is quite impossible to comprehend such a case as the following:

A male child suffered from cough and bronchitis from the fourth month of life, and at the age of 13 months was admitted to hospital. He remained in hospital 13 months. His general condition during this time was excellent, he put on 10 lb. in weight and on discharge was over the normal weight for his age. There was no dyspnœa and very little cough. He had both clinical and X ray evidence of consolidation of the upper part of the left lung, the extent of which was surprising in view of the boy's excellent condition. The lung was needled twice but no fluid obtained. The Mantoux intradermal test gave a markedly positive reaction. The sputum was examined for tubercle bacilli on two occasions, and the stools on no fewer than 13 occasions, but always with negative results. After he had been in hospital 10 months his fasting gastric juice was injected into a guinea-pig, and the animal subsequently developed tuberculosis. Two months later this procedure was repeated with a similar result. Considering that his general condition was so good, he was discharged from hospital when he was two

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* An address delivered to the Sheffield Medico-Chirurgical Society.

years and two months old. Eighteen months later—that is, two and a half years after first being observed—a radiogram of his chest was reported as normal.

I submit that this case was proved to be a tuberculous infection of the lung of benign character, since during the whole time the boy was in hospital he was practically free from symptoms and made a complete recovery. I cannot see that Findlay[5] has any ground for the statement that in cases of this character

> "tubercle bacilli are never detected in the sputum, so that there is always the possibility, in fact the strong probability, that the condition is not tuberculous at all. . . . In our experience lesions conforming to the above description have been slowly resolving simple pneumonia, which has come under observation after the crisis."

It is quite true that the shadow in the radiogram may closely resemble that cast by an alveolar pneumonia, but for myself I cannot conceive of such a pneumonic condition lasting for a period of months, or years, and then clearing without showing any clinical or radiographic signs of fibrosis.

The well-known French physician—Grancher—in the closing years of the nineteenth century showed that exudates in a tuberculous lung sometimes completely cleared up—a condition to which he gave the name spleno-pneumonia—but interest in this subject was not aroused until in 1920 and 1921 Eliasberg and Neuland[6] reported the occurrence, and 6 to 18 months later the complete resolution of lobar exudates in one or more lobes in infants who gave a markedly positive tuberculin test. Some of these infants had tuberculous lesions in glands and bones, but in all cases the pulmonary infiltrations found came as a surprise because of their extent and the good general condition of the child. The case I have detailed corresponds in every way with their description, except that positive evidence was obtained that tubercle bacilli were present in the stomach washing. They called these lesions "epituberculosis," regarding them as non-specific, non-tuberculous inflammations occurring around a tuberculous focus. This view was based upon the commonly accepted theory of the lethal nature of pulmonary tuberculosis in young infants, the argument running thus: such a degree of exudate if it were tuberculous must have an acute onset, must render the patient very ill, must go on to caseation, and must eventually cause death. Therefore, because these patients recovered the condition could not be tuberculous. "A generation born to a tradition of pessimism in the prognosis of extensive pulmonary tuberculosis confronted with the clinical facts of recovery, prefers to dispute the specificity of the regressive lesions" (Reichle[7]). A little later—namely, in 1923—Langer[8] reported the case of a child who had an exudate in the left upper lobe which in course of time completely disappeared but reappeared after the injection of 0·1 mg. of tuberculin. The recurrence of the shadow was accompanied by dullness and diminished breath sounds, all of which (including the shadow) cleared up within 14 days. Langer regarded this as proving first, that the original lesion was tuberculous and, secondly, that the change in the lung produced by the injection of tuberculin was a specific one. The conception of epituberculosis was therefore altered, and it was regarded as an allergic phenomenon, a non-tuberculous inflammation occurring round a tuberculous focus, in fact around a Ghon's tubercle; a conception which makes epituberculosis strictly comparable with the inflammation, œdema, and redness which surround the injected tuberculin in a positive Mantoux reaction. There is, however, this difference: the shadow in the lung produced by tuberculin, and the area of redness round the Mantoux reaction soon disappear, whereas the shadow cast by epituberculosis remains for months or even years. The explanation of the transient character of the inflammatory changes in a positive Mantoux reaction probably lies in the fact that the amount of antigen is only small and soon absorbed.

A BENIGN FORM OF PULMONARY TUBERCULOSIS

My introduction to epituberculosis was the result of a visit to Prof. E. Gorter's clinic at Leyden in 1926, when he described a typical instance in a girl of 3 years in whom an exploration of the lung, in the region of the interlobar (upper and middle lobes) fissure, resulted in the withdrawal of a small amount of material in the needle, which on examination was found to contain tubercle bacilli. The interpretation of this finding was that the needle had entered the Ghon's tubercle. Eighteen months later, although the lung condition had shown considerable improvement, the child died from tuberculous meningitis and, on the result of an autopsy, he came to the conclusion that from a small caseous focus which was found under the pleura at the junction of the middle and upper lobe there had spread what he described as a "collateral inflammation over the largest part of the upper lobe."[9] Attending the out-patient department of the Birmingham Children's Hospital is a child who has the typical radiographic appearances of epituberculosis, which are slowly clearing up and from whom, over a year ago, tubercle bacilli were obtained by needling the epituberculous area. The odds against the contents of a small Ghon's tubercle, the site of which there is no indication, being tapped in two children, must be very great, and these findings, together with those of Langer, are very suggestive that epituberculosis is a true tuberculous process. Moreover, even more convincing evidence has been obtained by Spence[10] in the following case:—

> A boy, aged 7 months, old had typical signs of epituberculosis of the upper two-thirds of the left lung, which was explored when the child was 9 months old, tubercle bacilli being found in the needle contents. Four weeks later a second exploration was performed with the same result. On the first occasion the needle was inserted into the third inter-space in the axillary line, and on the second occasion it was inserted in the same space but in front in the mid-clavicular line and directed medially, so that the point of contact with the lung should be as far as possible removed from the site of the previous puncture. The child made a complete recovery, after an illness lasting some months, and the radiogram became normal.

We must agree with Spence that these findings placed the tuberculous nature of the process beyond doubt, and suggest that the whole lesion in epituberculosis is a tuberculous process. Spence indeed regarded the condition as a caseous tuberculous process, but I find it difficult to believe that the whole of the area could have been caseous and yet completely resolve.

The possibility that some caseous areas may heal completely must be admitted because Gardner[11] has shown by animal experiments that, by a process of resolution, caseation can be absorbed without leaving any trace of the original lesion. Further, Reichle[7] has found areas of caseous pneumonia showing giant cell formation contiguous with areas of infiltration which macroscopically were indistinguishable from ordinary broncho-pneumonia, and which microscopically showed simple inflammatory changes with numerous tubercle bacilli; in other words, the tubercle bacillus can produce a change which is in all respects similar to that produced by other organisms and from which it is universally recognised that complete resolution may occur. In a child under our care who died from epituberculosis both these changes were found, although tubercle bacilli were not demonstrated in the areas of pulmonary catarrh.

This child, a girl, whose mother had advanced pulmonary tuberculosis, was admitted to hospital for wasting at the age of 14 months. Tuberculin skin tests were positive and examination of the chest revealed only scattered rhonchi and a few râles. Three months after admission she had a rise of temperature to 102°–104° F., and there were many râles and rhonchi scattered over the chest, and 10 days later dullness over the right upper lobe was elicited. Prior to her death some four months later, this lobe was needled seven times, and on one occasion only a small amount of blood-stained fluid was removed, which did not show tubercle bacilli. The fæces were twice and the gastric juice once examined for tubercle bacilli, but none was found. Occasionally there were ronchi and râles to be heard over other parts of the lungs. At the autopsy the right upper lobe was completely consolidated, showed many miliary tubercles and one or two small cavities. Miliary tubercles were scattered over both lungs. The mediastinal glands were caseous and one of these had ruptured into the right bronchus, the branches proceeding to the middle and lower lobes being almost occluded with caseous material. Microscopically, in the upper lobe, contiguous with areas showing caseation, endothelial cell infiltration with giant cell formation, and numerous tubercle bacilli, were found small areas of pulmonary catarrh in which the alveoli contained many large mononuclear cells and thickened interlobar septa.

Epituberculosis does not occur until the tissues have become allergic, but from the evidence which I have submitted it appears obvious that it should be regarded as a benign form of tuberculosis and not a pure allergic reaction; although for convenience I shall continue to refer to it as epituberculosis. It is difficult to assess the relative importance in epituberculosis of allergy and the presence of tubercle bacilli in the affected area, but it may be that the persistence of the shadow in the radiogram is due to the actual presence of the bacilli in the area whereas the more evanescent character of the exudates which follow injection of tuberculin are due to tissue allergy only.

Children suffering from epituberculosis react positively to tuberculin tests and frequently are known to have been in contact with adults suffering from pulmonary tuberculosis. The condition is usually characterised by mild constitutional symptoms such as slight fever, some cough, and loss of weight; nevertheless, all symptoms may be completely absent, and the child appear active, healthy, and putting on weight. On X ray examination there is found an extensive area of pulmonary consolidation occupying a great part, or the whole of one or more lobes, and sharply delineated. Frequently also there are only scanty physical signs, but there may be dullness and tubular breathing over this area. As may be gathered, epituberculosis is usually only discovered by radiographic examination, the results of which are strikingly at variance with the symptoms, and often with the physical signs. The course, which is every chronic, lasting months or years, usually ends in a complete recovery. The shadow in the radiogram gradually clears from the periphery, and as it does so a calcified nodule—the calcified Ghon's tubercle—may become obvious, or enlarged and calcified hilus glands may be recognised. Sometimes also there is left a well-marked thickening of the interlobar septum. This thickening is the result of a pleurisy, perhaps associated with the epituberculous process, but more probably produced by the primary tubercle of Ghon, which is frequently situated directly under the pleura and may lead to extensive involvement of it. Although the Ghon's tubercle may not be seen in the radiogram until the shadow of epituberculosis has disappeared, it is highly improbable that it is formed as the result of epituberculosis, because until a degree of allergy has been produced the tissue reaction producing such a lesion as epituberculosis cannot occur.

If the infecting dose of tubercle bacilli is not too large, the initial infection of the lung not only in childhood but at all ages may not produce any symptoms and is quite likely to pass unnoticed.[12][13] At this period, which has been called the primary tuberculous state, the tissue reaction is of the proliferative—epithelioid—type. If the lesion is a small one, complete recovery is possible either by absorption or rapid calcification. The lesion may, however, persist, leading to infection of the bronchial glands and occasionally—particularly if the infecting dose is a massive one—to a rapid generalisation of the disease. A few weeks after the original infection, except in cases of rapid generalisation, a high degree of allergy develops and the tuberculin tests become positive; at this stage if the original primary stage fails to heal, or if a further infection with tubercle bacilli takes place, a different type of tissue reaction—the exudative reaction—occurs. This is characterised by a rapid outpouring of serum and leucocytes, and may be sufficiently extensive to produce a shadow in the radiogram; thus a child who is known to have been exposed to infection develops a positive tuberculin reaction and shows enlargement of bronchial glands or shadows in the lung usually between the fourth and seventh week after exposure (Holt and McIntosh[14]). In this the secondary tuberculous state the symptoms are those already described as occurring in epituberculosis, and such manifestations as phlyctenular conjunctivitis, erythema nodosum, and pleurisy may also be encountered. Earlier in this address the childhood type of tuberculosis was defined as being the diffuse and focal lesions in the lungs and adjacent tracheo-bronchial glands, which result from the first infection of the pulmonary tissues by the tubercle bacillus; a definition which it is therefore quite obvious covers epituberculosis.

Ghon's Tubercle

The actual results produced by this primary infection of the lungs depend almost certainly upon the size of the infecting dose. With minimal doses of tubercle bacilli it is perhaps possible for complete recovery to occur without involvement of the bronchial glands. In mild degrees of infection a Ghon's tubercle probably develops with involvement of the bronchial glands, and possibly the latter may occur even without the formation of the primary tubercle. If the infection is rather more severe a definite Ghon's tubercle is formed, the glands become infected, and after a few weeks, when a degree of allergy has developed, a severe inflammation develops around the primary focus—a perifocal pneumonia—which if it is of any extent produces the phenomena of epituberculosis. This eventually clears, and even the Ghon's tubercle may heal. A pleural effusion may occur, due to an associated pleurisy. If the infection is of an even greater degree of severity the perifocal pneumonia may progress to necrosis caseation, or cavity formation. If not too extensive these lesions may eventually heal by fibrosis or calcification, but although, on the basis of radiographic examination, healing after cavity formation has been reported by Gerstenberger and Burghans[15] and others, in my opinion this is extremely improbable and the cases reported are not beyond criticism. If the primary infection is overwhelming in character a massive caseous pneumonia with cavitation may occur.

From the Ghon's focus or the caseous lung or bronchial glands the blood may become infected and either a miliary tuberculosis result or tuberculous lesions develop elsewhere, depending on the degree of infection of the blood. Sometimes at autopsy miliary tuberculosis is found with only a minute Ghon's focus and not very large caseous bronchial glands, suggesting that the child had not put up any fight, and blood infection and generalisation had occurred shortly after the primary infection. It is usually assumed that bone and joint tuberculosis in children is chiefly due to the bovine bacillus, but Griffith's [16] statistics show that in England in children under five, almost three-quarters, and in children over five, more than four-fifths, of the cases are due to human tubercle bacilli: in Scotland, on the other hand, these figures were respectively two-fifths and three-fifths—i.e., bovine infection predominates.

The Ghon's tubercle varies in size from that of a millet seed to that of a greengage plum. In one-third of the cases in his series Ghon found the lesion to be the size of a pea. It is situated at the periphery of the lung parenchyma, and in 90 per cent. of cases is directly subpleural, the organisms having lodged in the smallest bronchioles. Caseation, and sometimes in the largest foci cavitation, occurs; in smaller ones there may be a degree of healing as shown by attempts at capsulisation and even calcification. Adhesive pleurisy is also present in quite half the cases. The small Ghon's tubercle may be difficult to find and require a diligent search; indeed, it is often better to harden the lung in some fixing fluid before it is cut. Ghon himself frequently had great difficulty in finding the primary focus, and often missed it after hours of searching, "only to find it at a subsequent time and on further tireless examination." Sometimes there is more than one focus and Ghon found this in 16 per cent. of his cases. The distribution according to lobes of the primary focus in Ghon's series, and as judged radiographically by Stoloff [17] in Vienna, is shown in the accompanying table (Table I.).

TABLE I

		Ghon.	Stoloff.
Right lung	Upper lobe	72	118
	Middle lobe	19	69
	Lower lobe	48	167
Left lung	Upper lobe	59	71
	Lower lobe	44	99

Before leaving this aspect of the tuberculosis of childhood, I wish to make it quite clear that resolving shadows in the lungs of children suffering from pulmonary tuberculosis or of those showing positive skin tests may be due to at least two other causes—namely, pneumonia and atelectasis. The differentiation between epituberculosis and pneumonia has already been given, and it may be distinguished from atelectasis by the following features. The shadow of epituberculosis usually occurs in an area which is not involved by atelectasis—for instance, in the central area of the lung. In atelectasis the radiographic appearances differ from epituberculosis in that the atelectatic area is smaller in size and retracted towards the hilum, the heart and superior mediastinum are dislocated, and there is elevation of the diaphragm on the affected side. The shadow of epituberculosis clears slowly from the periphery, a form of clearing which would not occur in atelectasis. Atelectasis may occur from pressure of enlarged glands on a big bronchus, and Stoloff [18] has reported the occurrence of massive collapse of the lung as the result of a primary tuberculous complex, but in this case the lung expanded again within a period of four days. Again, Morlock and Scott Pinchin [19] have recently described an instance of atelectasis of the right upper lobe in a boy aged fourteen years, which gave a radiogram like epituberculosis and which disappeared after bronchoscopy. By bronchoscopy a tumour was seen passing into the lumen of the right bronchus, part of which was removed and showed typical tuberculous granulation tissue. Two weeks later the shadow reappeared, and three weeks later again the shadow once more was absent. In these respects the shadow differed from that seen in epituberculosis, the characteristic of which is its persistence for a long period.

Results of Reinfection

To complete the survey of the natural history of pulmonary tuberculosis in childhood the effect of reinfection must be considered. Reinfection may take place from without—a fresh infection—or from within. Auto-reinfection may occur in several ways: (1) by a direct spread from the root glands; (2) by dissemination in the blood stream from a tuberculous focus producing miliary or larger conglomerate lesions; (3) by the erosion of bronchus by a caseous gland producing massive infection of the area it supplies, with widespread dissemination by the bronchi to other parts of the lung and also to the opposite lung. It is clear that if infection occurs by either of the two latter methods a fatal result is certain should miliary tuberculosis develop, and almost certain otherwise. The prognosis when reinfection by extension from hilar glands or from without depends on the power of the child to localise the lesion. The older the child, the more likely is localisation to occur and chronic tuberculosis of the adult type to develop. It is, therefore, obvious that the child has to be under observation for some time before a definite prognosis can be given; nevertheless, the condition is always serious, and the younger the child the more likely is the disease to progress rapidly to a fatal termination either by extension throughout the lung or as the result of miliary tuberculosis. When this power of localisation has been evolved the condition has been called the "tertiary tuberculous state" and is due to the development of a degree of immunity as a result of recovery from either the primary or the secondary state. The development of hypersensitiveness has nothing to do with immunity, indeed Rich [20] has shown that active immunity can be produced without the development of allergy; further, Sabin [21] having produced in animals a high degree of tissue allergy to tuberculo-protein by sensitising them with the purified protein of tuberculin, injected tubercle bacilli into their lungs and found that they were more, not less, susceptible to infection—a state of affairs exactly comparable with reinfection in the young child.

From this review it is therefore, I think, proved that tuberculosis of the childhood type is in some degree very frequent, and, particularly after the period of infancy has been passed, is probably often benign in character. Various estimates, such as 50 to 100 per cent., have been formed as to its mortality in infancy, but even the lower figure is probably too high. The statement has also been made that in the second and third year infection is very common, but symptoms of the disease rare. It is probable that even in infancy benign cases do occur, but massive infections are more likely in their period than in later life, and hence the greater mortality. In view of the frequency of these benign infections are we to fold our hands and say that nothing remains to be done except to try to prevent reinfection? God forbid. This benign disease may be fraught with the most serious consequences—namely, tuberculous meningitis—and it is to this phase of the problem that I would now direct attention.

Tuberculous Meningitis

It may be argued that tuberculous meningitis, although always fatal, is not really a menace worthy of consideration because the total number of cases is small. I want, however, to make it clear that the condition is by no means rare. In the Birmingham Children's Hospital, from Jan. 1st, 1932, until Sept. 30th, 1933, a period of 21 months, there have been no fewer than 60 cases of tuberculous meningitis; 33 of these having occurred in the first 9 months of the year 1933. The remarks that follow apply to the Birmingham area, since there is evidence to show that bovine infection is more frequent in Scotland, although it should also be remembered that in other countries infection with the human bacillus plays an even greater part than in England.

Through the kindness of my colleague R. J. Gittins, pathologist to the Children's Hospital, I am able to quote the results of the post-mortem examinations of 671 children under 12 years of age. These autopsies were performed in a period of less than 3 years, and out of that number in 100 cases death was due to tuberculosis, chiefly tuberculous meningitis. The distribution of the lesions found in these cases is shown in Table II. In the earlier autopsies an intensive search for Ghon's tubercle was not carried out, otherwise the percentages under this head would have been higher, and they are considerably higher in autopsies carried out during the last year. For the purpose of comparison, the number of fatal cases of clinical broncho-pneumonia have also been calculated, and over a rather longer period of time these form an almost identical percentage of autopsies. In our hospital records, therefore, nearly one-third of all deaths are due to tuberculosis and pneumonia, and these rank equal as the two most killing diseases of infancy and childhood.

TABLE II.—*Fatal Tuberculosis in Childhood*

In a series of 671 autopsies tuberculosis was the cause of death in 100 (14·9 per cent.). The most advanced lesions in these cases were situated as follows:—

Tracheo-bronchial glands	71
Mesenteric glands	18
Cervical glands	1
Doubtful	6
Caseating glands not found ..	4

Seventy-one cases were examined for Ghon's tubercle and this was present in 49 (70 per cent.): right lung, 28; left lung, 21.

Ten children (1·5 per cent.) who died from other conditions showed tuberculous lesions at autopsy.

Another of my colleagues, A. V. Neale, has investigated the histories of 300 children under 12 years of age, who died from tuberculosis in the Birmingham Children's Hospital and a small general hospital in the same area during the years 1920–1933. In 68 of the children it was known at the time of their admission to hospital that they had been in contact with adults suffering from open pulmonary tuberculosis, and of these children 63 had primary thoracic and only two primary abdominal lesions. In three instances the infection appeared to be generalised from the onset. Through the kindness of the local public health authority visits were paid to the homes of 47 of the children in whom a history of contact could not be obtained at the time of their admission to hospital, with the result that open tuberculosis was found in adults—in most instances the father—who had access to 22 of these children. Two hundred and four of the children were under the age of 3 years, and 66 occurred in infants at the breast. Of these infants 23 were known to have been in contact with an adult suffering from open pulmonary tuberculosis. The infecting source was usually one of the parents, and, oddly enough, even in these breast-fed children, the father (13 cases) was more frequently the culprit. The reason for this is probably that a mother suffering from open pulmonary tuberculosis is rarely able to bear the strain of lactation; subsidiary causes may be the facts that women usually swallow their sputum and that fathers in the lower classes not infrequently are guilty of promiscuous expectoration.

MENINGITIS

These investigations showed that the youngest member of the family, especially if an infant, was the most likely to be infected, and they clearly indicated that the problem of preventing tuberculous meningitis in infants is that of preventing their infection with the human bacilli. The focus from which the blood stream is infected with human tubercle bacilli is either the Ghon's tubercle—rarely some other focus in the lungs—or breaking down mediastinal glands. Bovine infection cannot by any means be ruled out as a source of meningitis, because Griffith [16] has shown that bovine tubercle bacilli were found in the meningitis of more than one-third of a series of 52 children under the age of 14 living in England who died from tuberculous meningitis.

ITS PREVENTION

The prevention of tuberculous meningitis of bovine origin is a comparatively easy matter, and can be achieved by the furnishing of a safe milk-supply, a condition of affairs which would eliminate primary abdominal tuberculosis. According to estimates made by the Ministry of Health 7 per cent. of the milk supplied to large towns contains tubercle bacilli. The milk-supply can be rendered safe either by the production of tubercle-free milk or by destruction of the bacilli by pasteurisation, sterilisation, or drying the milk. The former is, of course, the better method, but it is the more expensive and difficult to carry out. Certified and Grade A (T.T.) milk may usually be accepted as free from tubercle bacilli, although there are certain loopholes in their production which suggest that even milk of this high standard is not always absolutely safe. Nevertheless, it is probable that an absolutely tubercle-free herd, and therefore tubercle-free milk, can be obtained if a herd of non-reactors is used for breeding purposes and cattle from outside sources are never introduced. An experiment which gives support to the preceding statement has recently been carried out for the Medical Research Council by Jordan in Ayrshire.[22] This experiment, which extended over three years, was concerned with an area nine miles square, and included about 30 herds. Each herd was divided into two groups and, when possible, the reactors were housed in separate buildings; if not, the reactors and non-reactors were housed at different ends of the barns and care taken to prevent cross-infection. They were grazed in separate fields, had separate water-supply, and infection from manure was guarded against. The non-reactors were recruited from young non-infected stock, mostly bred by the owners themselves and each herd was re-tested at six-monthly intervals. The reactors were sold in the open market. At the end of three years 20 herds were free from tuberculosis, whereas at the commencement of the experiment only eight were free.

Alternatively, tubercle bacilli can be killed by efficient pasteurisation, and in many towns in Canada and the United States, where such pasteurisation is compulsory, abdominal tuberculosis is a clinical curiosity. I have visited many pædiatric clinics in these two countries and can add my personal testimony to the truth of that statement. Furthermore, pasteurisation possibly, nay probably, provides an answer to the criticism implied in the question: Is not the ingestion of tubercle bacilli of great value in developing immunity in the child? The answer is in the affirmative, if only the dosage could be controlled, and this fact is, of course, the basis of the B C G method of immunisation of young children. Pasteurised milk almost certainly contains the toxins of the tubercle bacillus, and these probably are of value in producing immunity, whereas if certified milk is given immunity does not follow. The only real drawbacks to pasteurisation of milk are: first, that it may not be efficient; and, secondly, that as a rule butter is made and cream obtained from unpasteurised sources. Unless the milk is held at 145° to 150° F. for 30 minutes, the process is possibly more harmful than if the milk were not heated at all. It is of the greatest importance that the temperature recording apparatus, and all the other apparatus used in pasteurisation, should be absolutely reliable, and if there is any doubt about the efficiency of the process, the only safe method is to boil the milk or use a good brand of dried or condensed milk.

The elimination of tuberculous meningitis of human origin is a much more difficult task, since it consists in removal of all possibility of infection by tubercle bacilli of the human type. Many instances of tuberculous meningitis which come under my notice occur in homes in which one of the inmates has an unsuspected open pulmonary tuberculosis, or a known sufferer from that condition has failed to carry out the necessary precautions. It has been truly said that "there is more than one way of telling whether or not an adult has an open tuberculous lesion: one can find the bacilli in his sputum, or one can find the infection in his baby" (Park). The first thing in attempting to deal with this scourge is a closer examination of contacts, and especially when these are young children. In a family in which open tuberculosis is present the sufferer and the young children should be separated completely, or, if that is impossible, contact should be reduced to a minimum, and the most rigid precautions taken in regard to disposal of sputum. Careful examination of the children should be undertaken from time to time and such an examination should include the performance of the intradermal tuberculin test and a radiographic examination of the chest, both antero-posteriorly and obliquely. By this means I am sure many more cases showing exudative lesions, such as I have described, will be discovered; indeed, Armand-Delille and Lestocquoy [23] state that 50 per cent. of all pulmonary tuberculosis between the age of 5 and 10 years is of this type. I am far from convinced that this work of the examination of contacts is being carried out as efficiently as it should be, and the fault probably is not entirely that of the tuberculosis service. It is probable that none of us who has patients suffering from pulmonary tuberculosis can be entirely exonerated. Often the patient himself creates difficulties, and does with right remind us that his home is his castle and not ours. Yet, in spite of all this, I believe that more could be done in this direction by the tuberculosis service, and that there could be more coöperation between that service and the patient's doctor. I have stressed this point because contact examination is the key to the solution of this problem.

Difficult as is the problem of efficient examination of contacts, that of dealing with the children who give positive tuberculin reaction and show exudative changes in the lungs is even more difficult. There is no question that the ideal course is to remove such a child from its surroundings, or to remove the source of infection from the house, although such a counsel of perfection can rarely be carried into effect. In Toronto these children are sent to a preventorium, a branch of the children's hospital, and, of course, in France they are removed from their homes and dealt with under the Grancher system, although no child is accepted in the Grancher homes if there are any clinical or radiological signs of tuberculosis. Children who can be removed from their homes should not be sent to a sanatorium unless it is one which only admits children, and in which there is rigid isolation of children with open pulmonary tuberculosis. In spite of all that is with truth claimed for sanatoria, there is in my opinion a chance that children may contract reinfections in them if for no other reason than that patients sometimes break rules; furthermore, many sanatoria are even less fitted to care for children than general hospitals. Unfortunately there are few preventoria in England for these children, and their provision offers a great opportunity for enlightened municipal enterprise. We have attempted to deal with the fringe of the problem at our hospital by sending a few of these children to our Swiss branch at Davos for a prolonged stay, but more accommodation is urgently required. When neither the children nor the infecting adult can be removed from the home the greatest care should be taken in dealing with sputum, and the contact between the children and the adult should be reduced to a minimum. The children should receive a generous diet, rich in vitamins, and be in the open air as much as possible. They should also have regular rest periods, and if there is any degree of pyrexia should be completely in bed, if possible in the open air. Finally, every care should be taken to prevent the occurrence of respiratory catarrhs because of the liability of these catarrhs to develop into pneumonia, which is such a serious complication.

Conclusion

My survey of the childhood type of tuberculosis is now finished, and no one is more conscious than myself of its inadequacy, nevertheless I trust that I have been able to convince you that tuberculosis in infancy and early childhood is often a benign infection of frequent occurrence having a good prognosis, but that this benign infection is capable of developing into perhaps the most terrible illness of childhood, before which we are absolutely helpless; moreover, it is frequently impossible to say of any given case that this dread complication will not occur. If I have conveyed to your mind something of the horror which tuberculous meningitis inspires in me, and of the ravages of a disease which carries off far too many of the fairest and brightest children in all ranks of society, your time and mine will not have been wasted. It will not have been wasted because we shall have made up our minds to do our share to prevent its occurrence by insisting in season and out of season on the carrying out by ourselves and by others of a rigid examination of contacts, and by educating public opinion to demand a safe milk-supply, and proper provision for the isolation and treatment of infected children. To finish on a note of sadness would, however, be quite unjustified because if there is one thing above all others that recent work on tuberculosis has shown, it is that the outlook for infants and young children infected with tuberculosis is vastly better than 15 years ago we could ever have imagined possible.

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OLIGURIA AND ALBUMINURIA IN BRIGHT'S DISEASE

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The conception of diminished urination in Bright's disease as an impaired capacity of the diseased kidneys to eliminate fluid is at once so simple and direct, and so much in accordance with many of the more easily observed clinical facts, that it has in the past been widely entertained and still forms the basis of many systems of treatment. It would appear, however, that never since Cohnheim[1] has retention of fluid by the affected organs been universally acknowledged as the primary and paramount cause of oliguria in œdematous nephritis of all kinds. While the reasons for this are numerous, and some appear very cogent, it is proposed here to deal with one only, and that is the paradoxical nature of the lesions which frequently exist in the kidneys of cases where oliguria has been a pronounced and enduring feature.

It has long been known that in many cases of subacute nephritis with obstinate œdema and oliguria the most obvious morbid changes in the kidney affect the tubular epithelium and are degenerative in nature, while the glomeruli seem little affected or even normal. As the latter are universally accepted as the eliminators of fluid, this anatomical substrate has usually been regarded as inadequate to account for diminution of the urinary flow, and for this and other reasons the cause of the oliguria in such cases has been sought in various occurrences outside the kidneys themselves. For a time a partial elucidation of this difficult problem appeared to be promised by the development of the conception of nephrosis (Munk,[2] Volhard and Fahr[3]) as a disease clinically and pathologically identifiable from subacute glomerulonephritis and possibly as a general metabolic disorder in which the kidney was only secondarily affected (Epstein,[4] Löwenthal[5]). According to this view, which has been especially promoted in this country by Bennett,[6] the oliguria of diffuse glomerulonephritis might be at any rate partly renal in origin, but in nephrosis the primary occurrence affecting distribution of fluid was œdema, and the prerenal deviation of fluid in this form resulted in the kidney having less to excrete, hence the oliguria. Apart, however, from the natural objection that this process alone could hardly be expected to maintain oliguria indefinitely after the reserves of space in the body were filled with fluid, it soon came to be recognised, partly on clinical and partly on pathological grounds, that a clean-cut separation of nephrosis from nephritis was difficult if not impossible. This has been acknowledged in the later appearance of the term "Nephritis mit nephrotischem Einschlag" (Fahr[7]) and the fact has been fully documented by Leiter,[8] who has shown that by no single feature or group of features can the most genuine nephrosis be distinguished during life from a disease which proves histologically to be subacute glomerulonephritis.

The later reactions on this impasse have been very diverse on the part of different authorities. Thus there are some, who in the main neglecting the possible significance of renal structural change in relation to the signs and symptoms, have still maintained nephrosis as an entity; while some have even considered that in nephritis of nephrotic type the now somewhat ill-defined syndrome of nephrosis is a something superimposed on the nephritis (Murphy and Warfield[9]). As representative of an opposing view may be mentioned Gainsborough[10] who has concluded that the invention of a new name has failed to embody a distinct condition and that the problem of subdivision of subacute nephritis is still unsolved.

The closer study of the renal histology in nephrotic cases which has accompanied more intensive clinical and biochemical investigations does not yet appear to have shed definite light on the situation. It has certainly been noted by experienced workers (Fahr,[11] Bell,[12] Gray[13]) that even in the cases of nephrosis, where the lesions at first sight appear most exclusively tubular, the glomeruli always show some morbid alterations. Unlike, however, the changes in glomerulonephritis, it is clear that these have frequently not been of such a kind as would occasion a diminution of blood flow, or hence, presumably of glomerular filtration, so that it has still seemed impossible to explain the very similar symptoms that may be observed in glomerulonephritis on the one hand and in nephrosis on the other by reference to a common cause in the renal lesions. In a recent article (Shaw Dunn[14]) the view was provisionally advanced that a common principle for renal retention of fluid in all œdematous oliguric nephritides might be arrived at on the basis of the modern theory of renal functionation (Cushny[15]) and that oliguria, according to that hypothesis, would most probably depend on excessive reabsorption by the renal tubules from a glomerular filtrate which might be originally normal in amount. Such an explanation would adapt itself especially readily to the peculiar phenomena of nephrosis, where sodium chloride, which is relatively abundant in the blood, is retained along with water, while urea which is scanty in the blood is readily concentrated and eliminated. A suggestion was then made as to how imbalance of reabsorption might arise in diffuse glomerulonephritis where there is clearly a limitation of reserve of the glomerular circulation, but no concrete idea could be formulated to account for a similar disturbance in nephrosis with the capillaries of the tufts uniformly patent. Since that time a further study of the glomeruli in nephrotic cases by special methods has revealed an aspect of their lesion which appears to offer an explanation in this case also, based essentially on the same principle, and originating from a vascular cause.

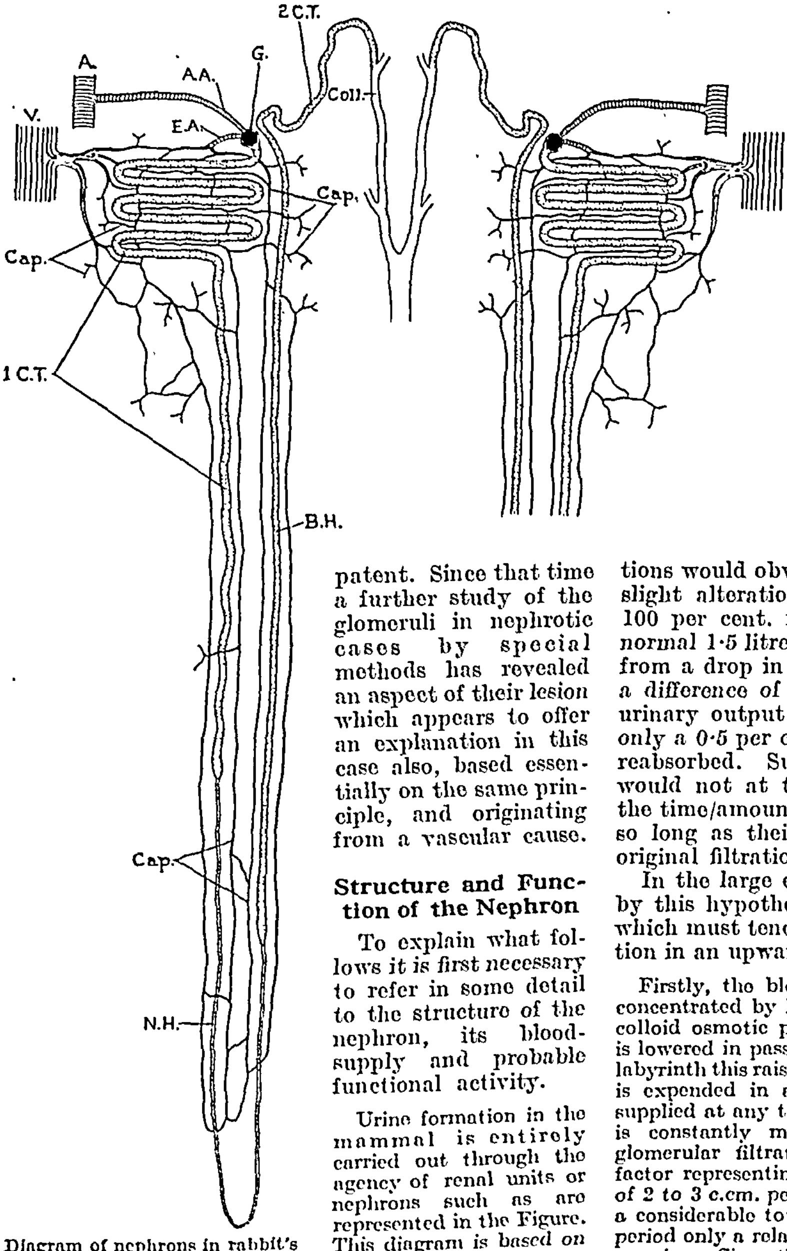

Diagram of nephrons in rabbit's kidney drawn approximately to scale from Huber's measurements of an actual structure. A. = Artery. V. = Vein. A.A., E.A. = Afferent and efferent arterioles. G. = Glomerulus. Cap. = Capillaries. 1 C.T., 2 C.T. = Convoluted tubules. N.H., B.H. = Narrow and broad limbs of Henle's loop. Coll. = Collecting tubule. (× 20.)

Structure and Function of the Nephron

To explain what follows it is *first necessary* to refer in some detail to the structure of the nephron, its blood-supply and probable functional activity.

Urine formation in the mammal is entirely carried out through the agency of renal units or nephrons such as are represented in the Figure. This diagram is *based on the drawing and measurements of an actual* average nephron from a rabbit's kidney by Huber.[16] The coiled mass of almost nude capillaries forming the glomerulus is a relatively small structure measuring in this animal 0·1 to 0·125 mm. in diameter, while the secretory part of the tubule passing from it is very long, 24 mm., and narrow, 0·05 or 0·06 mm. in external diameter: the internal diameter is variable, but even in diuresis may be only about 0·02 mm. (Brodie and Mackenzie[17]). Observing the same proportions a glomerulus 4 or 5 in. in diameter would supply a tubule of not more than an inch internal diameter and 80 ft. in length. The surface at which interchange occurs in the concentration of urine is thus relatively very large, and it is important to keep in mind that *every drop of urine that escapes to the collecting tubules* has first to pass through such units. The vascular arrangements are peculiar in that the tubules, *both cortical* and medullary, are supplied exclusively with blood which has first passed through glomeruli (Huber[16]) and given up more or less filtrate. The capillary network around the tubules is abundant and anastomoses freely, so that there can be no question of the efferent arteriole from one tuft supplying only its own tubule.

According to the modern theory the whole of the process *of extrusion* of excretory products from the blood occurs by *filtration* of protein-free plasma under pressure from the tufts and this is concentrated *in the* tubules by reabsorption of almost all the water along with threshold bodies while only purely excretory products and useless excess of threshold materials remain in the formed urine. The amount of urine may represent only about a hundredth part of the original filtrate, ninety-nine parts having been taken back, so that the large variations of urinary output which can occur under natural conditions would obviously be most easily accounted for by slight alterations in the proportion reabsorbed. A 100 per cent. rise in daily output of urine from a normal 1·5 litres to a polyuria of 3 litres would result from a drop in reabsorption from 99 to 98 per cent., *a difference of only 1 per cent.* Similarly a fall in urinary output to one-half the normal would entail *only a 0·5 per cent. increase in the amount of filtrate* reabsorbed. Such variations in urinary output would not at the same time involve *alterations in* the time/amounts of excretory substances eliminated so long as their titre in the plasma and the *rate of* original filtration did not vary.

In the large exchanges of fluid which are involved by this hypothesis certain factors can be recognised which must tend to influence the amount of reabsorption in an upward or downward direction.

Firstly, the blood supplying the tubules, having been concentrated by loss of the filtrate, has acquired a raised colloid osmotic pressure: when the hydrostatic pressure is lowered in passage to the wide capillary network of the labyrinth this raised oncotic pressure provides energy which is expended in again taking up fluid. The force thus supplied at any time is no doubt of a low potential but it is constantly maintained so long as blood flow and glomerular filtration continue; when *multiplied by a* factor representing the large volume of renal blood flow *of 2 to 3 c.cm. per gramme per minute, it must* amount to a considerable total in the course of a day, during which period only a relatively small volume of fluid is elaborated as urine. Since this is work which is done by the circulation it is so much which is not done by any special vital activity of the renal cells. It may be remarked that in respect of outward passage of fluid from capillaries where the blood pressure is higher and the recall of it by the osmotic pressure of the plasma colloids where the hydrostatic pressure is lower, the above scheme is *identical* with that which was formulated by Starling[18] to account for nutritional irrigation of tissues from the capillaries and for lymph formation. From a consideration of the phylogeny of nephridia there is nothing very fanciful in the conception of renal excretion as a specialised modification of the formation of lymph: it is a conception which would exercise the same mechanism in the regulation of blood volume, as in what has been called by F. C. McLean [19] the regulation of body volume, so far as this is carried out by the kidney.

A second factor that can be recognised, this time working in the opposite direction, is the amount of urea and other excretory crystalloids in the lumina of the tubules. It is readily apparent that, while all other tissues in the body are freely permeable to urea, the cells of the renal tubules, and for that matter the epithelium of the whole urinary tract, are when normal relatively impermeable to it in a direction from lumen to blood stream. On no other consideration would it be possible to obtain the high concentrations of urea that may be found in normal urine. As has been shown (Dunn, Haworth, and Jones,[20] Dunn and Jones [21]), when the first convoluted renal tubules are injured by soluble oxalates while the circulation remains intact, the concentrating power of the kidney fails, and urea is retained in the blood. Later experiments, unpublished, have revealed the same effect in nephritis produced by uranium, cantharidin, and mercuric chloride, where also the first convoluted tubules are selectively damaged: the phenomenon occurs even with slight degrees of epithelial injury, and not only, as Gray [22] has assumed, when they are completely necrosed; if the damage is severe anuria results, presumably because the necrosed tubules have lost all capacity to regulate the passage of fluid and the latter finds its only escape from the kidney via the blood stream. In uric acid nephritis also (Dunn and Polson [23]), where the first convoluted tubules escape injury but the ascending limbs of Henle's loops and the second convoluted tubules are affected, exactly the same retention of urea with temporary oliguria or anuria is observed: the intactness of these lower segments is obviously as essential to a maintained concentration of urea as is a healthy state of the upper, apparently more highly specialised ones.

Since then urea is normally held in the lumina of the tubules it cannot but exert its physical osmotic property by holding back water from reabsorption through the cells into the blood. It is essentially on the basis of this view that the diuretic effect of medicinal doses of urea is usually explained, and there is no reason to doubt that the lesser amounts present naturally in the filtrate act functionally in the same way. When we remember the great length of the tubules it seems not at all unlikely that but for this normal diuretic action of urea the whole of the filtrate would always be reabsorbed, leaving nothing for excretion.

The Balance of Nephron Activity

It is not suggested that these two antagonised factors are the only ones which bear on the normal regulation of urinary volume, but it appears probable that in any scheme involving much filtration and reabsorption they must from their constant activity play a very large part in this; accordingly a very exact correlation of their action must be necessary in order to ensure that neither too little nor too much reabsorption occurs to suit the needs of the organism for fluid balance—in other words, that the correct volume of urine is eliminated.

In attempting to visualise a process whereby the above correlation could be upset as a result of glomerular disease, so as to produce excessive reabsorption of water and salt, without at the same time having diminished glomerular filtration, and therefore retention of urea, it has occurred to me that an explanation might be found in a disturbance of the normal alternation of glomerular, and therefore of nephron activity.

The view that the glomeruli are not continuously in action, but that they open up and close down intermittently has been firmly established for the kidney of the frog by the remarkable pioneer work of Richards and Schmidt.[24] They observed under the microscope not only alternating action of capillaries in the same tuft, but also temporary cessation of blood flow in whole tufts for unequal periods. In mammals direct examination of the tufts in action has so far proved impossible, but the experimental results of Khanolkhar [25] and of Hayman and Starr [26] in rabbits using indirect methods of intra-vital injection give good grounds for the belief that this is a universal process in the kidneys of higher animals as well.

Seeing that such an alternating action of the glomerular capillaries would only bring them into line with what is known of these vessels in other tissues where they can be directly observed during life (Krogh [27]), I will assume it to be a fact and will consider the effect that it may have on the activities of the nephrons.

The rate and degree of intermittent action of the tufts in man cannot be projected, but if we assume for the sake of clearness the extreme condition of one glomerulus out of three being open at a time, then we may regard a group of three adjacent nephrons as representing fractionally the whole activity of the kidney. We will then recognise that during any period the filtrate from the glomerular blood is passing to only one tubule to be concentrated, and that the process of reabsorption is aided only by the blood in the capillaries around that tubule; acting in the opposite direction we have the osmotic power of all the urea in that amount of filtrate. If now we assume for contrast that all three glomeruli are open at once, but that the total renal blood flow is unaltered, we will then have each tuft working continuously, but each with only one-third of the blood which formerly passed through one, and we will have three tubules each receiving one-third of the filtrate and urea which formerly went to one. Thus the same total amount of filtrate will be subjected to reabsorption over an area three times as large as before, and with the aid of the same raised oncotic pressure of blood proteins as before, but greater in extent because the capillary area around three tubules is in action. Against these factors tending to increase reabsorption we will have in the same period only the same total amount of urea as before, divided to three tubules, tending to hold fluid in the lumina. There will thus in the latter case be a liability for less fluid to remain in the tubule for excretion—in other words an oliguria, but with normal elimination of urea. As has been stated, the case taken as normal is the extreme one of cessation of activity of two out of three nephrons at a time, but with a less strict degree of alternation the same principles would hold good.

Disturbance of Glomerular Function in Nephrosis

In the application of the theoretical considerations set out above to the interpretation of the phenomena of human disease, it has already been suggested[14] that in diffuse glomerulonephritis the changes in the glomerular capillaries, which are partly blocked by thickened endothelium, would account for interference with the intermittent action of the tufts and so bring about the disturbance of balance already outlined. In this disease there is frequently no doubt a considerable degree of obstruction to blood flow in all the tufts, and a rise of blood pressure commonly results; the view is hardly tenable, however, that oliguria is in this case due to diminished total blood flow and lessened glomerular filtration, for in many instances oliguria and œdema are present while elimination of urea is still only slightly, if at all, impaired. To explain this state of affairs, if renal blood flow were much diminished, it would be necessary to assume that the diseased kidney was able to separate urea from the blood at a better rate than the normal one.

The condition of the glomeruli in nephrosis has always appeared to negative any possibility of an explanation of oliguria based on a change in the capillary vessels. Fahr's [11] account of them mentions slight general hyalinisation or thickening of capillary basement membranes but with maintenance of the lumina, wide and often empty of blood. Slight increase of endothelium may occur, and some cells may show fatty degeneration, but stigmata that might be of inflammatory origin are very slight, and there is often no histological grounds for assuming any obstruction to blood flow. In agreement with this, as is well known, the blood pressure in such cases is normal and hypertrophy of the heart does not occur. The continuance of a normal blood flow is also indicated by the absence of rise of blood-urea over long periods while oliguria and œdema continue.

The further suggestion to be made as to the significance of the glomerular changes here is based on the results of staining the capillary basement membranes by Mallory's connective tissue method.

This reveals the fact, not apparent by ordinary staining, that in addition to the slight diffuse thickening of basement membrane, there is a fixed patency of the capillary lumina in all the tufts, whether empty or blood-filled, in contrast with the conditions in normal kidneys where these exhibit all varying degrees of collapse or distension and a distended state is usually accounted for by the presence of red blood corpuscles. The ends of the arterioles in the tufts are also usually more widely patent than normally. The state of fixed patency of the capillary lumina is similar in general aspect to what has been described and figured by Baird and Shaw Dunn [28] in the nephritis of pregnancy and eclampsia, which is classified by some as a nephrosis.

The interpretation which it is proposed to place on this appearance is that from its constancy and diffuseness it is a significant change, and that it is an indication of abolition of the normal rhythmical contractility of the capillaries, whether that property belongs to their whole length or only to their arterial ends. In some instances the flaw has probably resulted from mild antecedent glomerulitis, seeing that minute adhesions occur as well on many of the tufts; in other cases definite signs of old glomerulitis are lacking, but it is not meantime considered that an inflammatory origin is ruled out. So far as function is concerned, the condition appears to provide a basis for unbalanced over-reabsorption of glomerular filtrate on the lines already indicated, with resulting oliguria. As the blood pressure in these cases has been normal, there is no reason to suppose that the arterial distribution to the kidneys as a whole has been different from normal, so that the permanent patency of the glomeruli would not mean an increased perfusion of the kidneys but only a permanently uniform distribution of the available blood.

ALBUMINURIA

The heavy and continuous escape of protein in the urine in nephrosis has often been considered almost as difficult to account for as the oliguria, by reference to the renal lesion. The view that this protein is eliminated because it is abnormal and not because of disease in the kidney (Epstein,[29] Thomas, Schlegel, and Andrews [30]) has not found confirmation, and with the support of Hewitt's [31] polarimetric analyses the majority of workers seem to regard it simply as serum protein, accounting thus for the low level of the plasma colloids. It is also generally believed to come direct from the glomeruli rather than the tubules, and the greatness of the loss is supposed to depend upon an abnormal permeability of the capillary walls (Fahr,[11] Gray [13]), though this is not easy to account for. It is, in fact, difficult to suggest any analogy in disease elsewhere in the body for an escape of a high concentration of protein from the capillaries which lasts so long and which is associated with such slight alterations in these vessels as we find in the glomeruli of nephrosis. The implications of the modern theory of excretion are again of particular importance in this connexion.

If we accept that urine is concentrated by reabsorption of, say, 99 per cent. of the glomerular filtrate we must recognise that a high albuminuria, say 2·5 per cent., can only result from the escape of a quite low titre, 0·025 per cent. of protein from the tufts, unless there is very active reabsorption of protein by the tubules. That the percentage of protein in the original glomerular filtrate must be low is also indicated by the great volume of the renal blood flow; at a moderate estimate this will normally amount in the human subject to between 800 and 900 litres per day, and as has been pointed out, in nephrosis with normal elimination of urea it is probably little if at all reduced. At this rate of flow an albuminuria of 20 g. per day would be accounted for by a loss of not more than 0·025 g. of protein from every litre of blood passing through the kidneys. Even with the plasma proteins reduced to one-half of their normal concentration this represents a very slow rate of leakage of protein from the capillaries; in the large volume of filtrate demanded by the modern theory the original percentage of protein may indeed be no greater than that which is found in the œdema fluids of this disease. Histological examination also, so far as it goes, would support the view that the protein content of glomerular filtrate is low and that concentration occurs in the tubules; albuminous deposit is rarely abundant in the capsular spaces while on the other hand solid casts are commonly seen in the lower tubule segments.

To account for this continuous slight loss of protein from the glomerular capillaries reference is made again to the interpretation of their functional condition which has been outlined above. The suggestion has been made that in all the tufts these vessels are permanently open, and that each tuft is being continuously perfused, but at a much less rate than is normal for an active tuft. This amounts to a permanent state of stasis with slight dilatation, a condition which, according to Krogh,[27] invariably results in the escape of more or less plasma protein from capillaries whose walls are otherwise normal. This explanation of the albuminuria of nephrosis has already been put forward by Govaertz and Cordier [32] as an alternative to a continuous action of some toxic agent, and it seems to fit the known facts much better than the latter hypothesis. The high level of the albuminuria at first sight, no doubt, seems to imply a severe damage of the vessels, but if such were present could the condition be expected to persist unchanged for so long as it does? The albuminuria of nephrosis may endure for many months, and at the end the glomerular changes are often only of the mild character already described. The suggestion given here attributes the high *percentage* of the albumin in the urine to the process of concentration by reabsorption of fluid in the tubules; its large daily *amount* is explained by a slight but constant deduction from the large volume of blood which passes through the kidneys in the day, and it refers the *escape of protein* from the glomerular capillaries to a more or less mechanical occurrence, the validity of which in other situations has not been doubted. It also makes no further assumptions regarding the structural and functional changes in the tufts than those which have already been made to account for the oliguria.

TUBULAR CHANGES

In this attempt to explain these cardinal phenomena of nephrosis, oliguria, and albuminuria, on the basis of changes that can be seen in the tufts only, it may appear that the well-known tubular lesions have been forgotten. The appearances of fatty and lipoid deposit, of hyaline droplet change, and of foamy swelling, are certainly often prominent in old-standing cases, but as Mayrs [33] has pointed out there is no evidence that the presence of these abnormalities interferes at all with one of the highest known functions of the tubule cells, that of concentrating urea, so that these cannot be supposed to be seriously degenerated. As has already been suggested by Aschoff [34] and by Govaertz and Cordier,[32] the presence of these abnormal substances in the cells may well be due to their having been reabsorbed from the filtrate in the tubules; hyaline droplet change is probably a reabsorbed protein, while the lipoidæmia always present in these cases will account for the large lipoid deposits sometimes seen. The prominent tubular appearances of nephrosis would, therefore, be accounted for, like the oliguria and the albuminuria, by the essential and primary lesion in the glomeruli.

Application to Other Forms of Nephritis

The view which has been presented of the interrelationship of structural change with renal functional disturbance has here been propounded almost solely in its bearing on the phenomena of nephrosis, but it is considered that the same principles would apply to the elucidation of those signs and symptoms which are shared with nephrosis by other forms of Bright's disease. On this basis it would become possible to comprehend the great clinical similarity of pure "tubular" nephritis or nephrosis to glomerulonephritis of nephrotic type, at a time when the latter has not yet revealed its true nature by a rise of blood pressure or the development of urea retention. In nephritis of pregnancy, where oliguria, œdema, and albuminuria are often accompanied by good urea excretion, it is now known (Fahr,[35] Bell,[36] Baird and Shaw Dunn [28]) that a slight but diffuse glomerular lesion exists which sometimes resembles that of nephrosis and sometimes a mild intracapillary glomerulitis; tubular changes, if present, are qualitatively the same as in nephrosis.

Amyloid disease of the kidney is occasionally associated with a clinical picture indistinguishable from that of nephrosis (Volhard [37]), and here we have, no doubt, as the primary pathological development an alteration of the glomerular capillary walls which may well interfere with their functional activities, while the tubular changes are again the same as in nephrosis or subacute glomerulonephritis.

In the promulgation of a theory which would account for oliguria and albuminuria in all œdematous nephritis purely on the basis of renal morbid histology and physiology, it is obviously impossible at the present time to submit completely verified facts in support of every contention, and in what has been written above resort has frequently been made to what are regarded as theoretical probabilities. The main assumption that has been made, and by it the argument stands or falls, is the correctness of the filtration-reabsorption hypothesis of urine formation. Exactly how this theory stands nowadays it is difficult to assess; many physiologists appear to accept it wholly or in part, and while a complete scientific proof that it is the sole basis of urine formation in mammals is hard to secure, the work of A. N. Richards and his collaborators,[38 39] has gone far towards a direct demonstration of its truth in animals with accessible glomeruli. So far as the present communication is concerned, the matter may be viewed in another light. It is a reasonable presumption in pathology that in disease an organ performs its function in a manner as nearly normal as the interfering factors will allow, and does not proceed to act on some entirely different principle. A theory of normal functionation which cannot be fully established is thus submitted to test when it is applied to the elucidation of the abnormal physiology associated with disorder of structure. In this respect it does not appear too much to say that the secretory theory of renal activity, involving glomerular filtration of only the amount of fluid which appears as urine, has been tried and has failed to provide a common type of cause for oliguria which may be combined with good urea concentration. If the logical application of the modern theory will provide such a principle it will be so much in confirmation of the validity of that hypothesis.

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ST. GEORGE'S HOSPITAL.—In 1933 in-patients totalled 5238, of whom 427 were children under 12. Their average stay was 20·26 days, and 20·74 per cent. of them were sent on discharge to Atkinson Morley's Convalescent Hospital. The weekly cost per patient was £4 10*s.* 4*d.*, an increase of 2*s.* 4*d.* There were 36,827 out-patients who cost a fraction over 7*s.* 6*d.* each. At £82,518 the ordinary expenditure showed a deficit of £84; the bank overdraft was £35,517.

SPINAL ANÆSTHESIA *

By H. K. Ashworth, M.B. Manch.

VISITING ANÆSTHETIST, MANCHESTER ROYAL INFIRMARY AND ANCOATS HOSPITAL

At the present time the majority of anæsthetists in England probably use one of the following drugs or preparations of drugs: Stovaine, Duracaine, Spinocain, Percaine, and Novocain crystals dissolved in cerebro-spinal fluid.

The ideal drug (as yet non-existent) for subarachnoid nerve-block:—

(1) Should be slightly lighter than the cerebro-spinal fluid, and this relationship should remain constant as long as the drug is active;

(2) Should have a high degree of local action on, and be rapidly "fixed," by, the nerve-roots;

(3) Should have a slow rate of blood absorption;

(4) Should be easily administered and easily controllable;

(5) Should maintain its anæsthetic effect for as long a time as is required.

None of the five preparations mentioned fulfil all of these criteria, and when such a drug is invented many of the existing difficulties of subarachnoid block will disappear.

Stovaine is the oldest of the preparations in common use, and for many cases is still pre-eminent. It has the advantage, first, that the manipulative technique required for a successful administration is small, since an adequate dose is contained in a small volume of solution and it requires little or no mixing with the cerebro-spinal fluid. Moreover, Barker's solution is considerably heavier than cerebro-spinal fluid and gravitational diffusion is all that is needed to obtain the required height of anæsthesia. Secondly, stovaine has the merit of being rapidly "fixed" by the nerve-roots, so that it is perfectly safe to place a patient in full Trendelenburg position 15 minutes after injection, without fear of any upward spread which might paralyse the anterior roots of the phrenic nerves. The one possible disadvantage of stovaine is that its action is transient, and anæsthesia in the upper abdomen rarely lasts for longer than 45 minutes.

Spinocain enjoyed a great vogue a few years ago but is now becoming increasingly discredited. It is an alcoholic preparation of novocain with a specific gravity slightly less than that of the cerebro-spinal fluid. Owing to the greater rapidity of absorption of its more volatile alcoholic constituents, the relation between its specific gravity and that of the cerebro-spinal fluid becomes a variable and unknown quantity after injection, with the result that neither accuracy of the anæsthetic level nor certainty of fixation can be obtained.

Duracaine is a somewhat similar solution but heavier than the cerebro-spinal fluid and without the strychnine present in spinocain. Novocain solutions are claimed by their users to be less toxic than stovaine or percaine. Doubtless this claim may be substantiated in the experimental laboratory, but it does not hold good in clinical practice. Novocain, because of its weaker anæsthetic properties, has less affinity for nerve-roots than its much stronger rivals and this lack of affinity is in itself a source of two possible dangers. First, it is difficult, if not impossible, accurately to gauge the time in which such solutions are fixed and the patient may safely be placed in the Trendelenburg position without fear of phrenic paralysis. Secondly, the novocain which is not taken up from the cerebro-spinal fluid by the nerve-roots passes into the blood stream, and as a large dose of this comparatively weak anæsthetic agent is commonly injected in the process of spinal anæsthesia, the amount absorbed from the blood is by no means negligible.

Percaine.—The nearest approach to the ideal drug for spinal anæsthesia at present known is probably the 1 in 1500 solution of percaine in 0·5 per cent. saline. Percaine is slightly lighter than the cerebro-spinal fluid and this relationship remains constant so long as the drug is active. The one disadvantage is that the large volume of the required injection increases the margin for manipulative errors during administration. Percaine has the great merit of permitting accurate dosage, using the method described by Howard Jones. With the patient in the lateral flexed posture, the spine is measured in inches from the vertebra prominens to the spot at which it is crossed by a line joining the highest point of the iliac crests. From this measurement a subtraction is made of 4 for a man, 6 for a woman, and 7 for a child of 8–10 years of age. The resulting number, expressed in c.cm. of percaine solution, represents the dosage which should be injected at the level of the second or third lumbar interspace in order to obtain anæsthesia extending as high as the fifth dorsal nerve-roots. This is the level required for full abdominal anæsthesia. The formula works in practice, and it is found that the height of anæsthesia always lies between the third and fifth dorsal nerve-roots. For subumbilical surgery there is no need to measure the patient, and 10–12 c.cm. will always suffice to provide anæsthesia for such operations as prostatectomy, hysterectomy, or herniotomy. Another advantage of percaine is that it is the only spinal anæsthetic which can safely be given and the patient then left upon a flat table or trolley, provided that the ventral decubitus is adopted; there is no fear of the anæsthetic spreading either too high or not high enough. Much time can often be saved by administering a spinal anæsthetic in the anæsthetic room instead of waiting until the operating-table has been vacated by the previous patient.

THE CHOICE OF DRUG

I should, however, like to suggest that every patient should receive the preparation most suitable for the condition and operative need of that particular case, and not simply a routine dose of the anæsthetist's pet preparation. This statement does not imply that an anæsthetist should use a different preparation for every subarachnoid block, and thus risk failing to obtain a thorough technical and physiological understanding of any drug. For example, Barker's stovaine Billon cannot, in safe dosage, be guaranteed to maintain upper abdominal anæsthesia for more than 45 minutes. It seems to me for this very reason to be the best existing drug to use for subarachnoid block in urgent abdominal surgery if a spinal anæsthetic is required. Most urgent abdominal operations should be, and usually are, performed within this space of time, and by using stovaine with its comparatively transient effect the patient is, from the anæsthetic standpoint, restored to physiological normality as soon as possible after the operation is completed. Among examples of the benefits often conferred by this procedure may be mentioned:—

1. There is less risk of respiratory complications, since the lower intercostal muscles are paralysed by the anæsthetic for a minimum period of time.
2. The patient may be nursed immediately in the most favourable surgical position indicated, without reference to the anæsthetic.
3. He may immediately, if surgically indicated, take fluids by the mouth. Or again, Barker's solution, with its

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* Read before the Liverpool Society of Anæsthetists.

specific gravity of 1025, drops immediately into the sacral recess if injected into the subarachnoid space with the patient sitting upright, thus providing an excellent, localised, and adequately long "saddle area" anæsthesia, ideal for such operations as hæmorrhoidectomy or cure of fistula-in-ano.

Conversely, percaine solutions, which will maintain abdominal anæsthesia for two hours, are obviously more suitable than stovaine for an operation such as resection of the colon but as obviously unsuited for the performance of hæmorrhoidectomy. My own practice is to use either percaine or stovaine, according to the needs of the case, basing my choice on the lines indicated above, and I do feel that, when a spinal anæsthetic is decided upon, the anæsthetist should think a step further than a mere routine dose of any single drug.

CONTRA-INDICATIONS

There are five absolute contra-indications to subarachnoid nerve block. They are: (1) organic disease of the nervous system, e.g., disseminated sclerosis, meningitis; (2) recognised mental abnormality; (3) pyæmia; (4) septic disease in the route of injection, e.g., cellulitis of the back; and (5) operation above the diaphragm. Relative contra-indications are :—

1. Deformity of the spine in which intrathecal puncture is difficult or impossible.
2. Low pre-operative blood pressure. This often provides one of the most difficult problems which are presented to an anæsthetist. It is impossible to fix an arbitrary low-level limit, and every case must be judged individually.
3. Very young or highly strung patients should not be subjected to spinal anæsthesia unless their consciousness can be both adequately and safely damped down by suitable pre-operative medication; in this connexion the words "adequately" and "safely" are, unfortunately, not often compatible.
4. The presence of any disease which is associated with a great depletion of the blood volume. Abdominal hæmorrhages and acute intestinal obstruction are in this category although, paradoxically, intestinal obstruction provides one of the greatest indications for spinal anæsthesia. The apparent paradox can be resolved by pointing out that, whereas in cases of acute intestinal obstruction the blood volume can be safely increased by the intravenous administration of at least 2 pints of normal saline solution before operation, the same procedure cannot be carried out safely in the presence of uncontrolled hæmorrhage.
5. The performance of any operation which involves violent or noisy procedures which are likely to be very disturbing to a conscious patient. Many orthopædic operations fall within this category.
6. Any operation in which a large degree of surgical shock is probable.
7. Operations on the kidney. The lateral kidney posture is an extremely unpleasant one for a conscious patient; any difficulty in delivery of the upper pole often causes pain owing to the involvement of the diaphragm, and the bridge hinders the circulation by preventing a free return of blood via the inferior vena cava and thus increases the risk of any fall in blood pressure.

INDICATIONS

The three absolute indications are: (1) The presence of serious disease of the respiratory system, e.g., phthisis or bronchitis. (2) Acute intestinal obstruction with distension. In these cases the operative facility provided by spinal anæsthesia outweighs the often grave risk of the slight additional fall of blood pressure in an already collapsed patient. (3) For lumbar sympathectomy. Besides providing the perfect muscular relaxation necessary for this operation, spinal anæsthesia provides a valuable prognostic guide as to whether operation is likely to result in permanent improvement in the circulation in the legs.

The relative indications for spinal anæsthesia are probably the most controversial of any, and the following list represents purely personal opinions :—

1. Urgent abdominal surgery in adults, with the exception of that necessitated by hæmorrhage or associated with extremely low blood pressure. In addition to the benefit conferred on the surgeon by providing him with the greatest possible amount of muscular relaxation when most he needs it, the patient has finished receiving all harmful anæsthetic effects within a few minutes of the end of the operation, and has no extra strain to bear of the post-operative excretion and sequelæ associated with general anæsthesia.
2. Genito-urinary surgery, and particularly prostatectomy, but excluding, as a rule, operation on the kidneys unless renal function is so poor that excretion of a general anæsthetic might be a dangerous post-operative strain.
3. The presence of metabolic diseases, e.g., diabetes mellitus, or damage to excretory organs, e.g., cirrhosis of the liver, Bright's disease.
4. The presence of cardiac disease, with the exception of aortic incompetence.
5. The rare patient who dreads unconsciousness during operation more than consciousness.
6. Long operations in which muscular relaxation is essential and in which, therefore, the patient would otherwise need a lot of ether, thus adding to the harmful stimuli received. As examples of this class of case may be mentioned gastrectomy, resection of the colon, and abdomino-perineal resection of the rectum.
7. The type of patient who would be difficult to control or adequately to relax under a general anæsthetic, i.e., cases in which the amount of general anæsthetic required would be disproportionately great in comparison to the operation to be performed. The commonest examples are the professional footballer with an internal derangement of the knee-joint, the policeman with hæmorrhoids, or the publican with a fractured patella. In such cases spinal anæsthesia relieves the anæsthetist from what often used to be a very damaging and exhausting struggle during induction.
8. Amputation of the leg, provided that due precautions are taken to prevent the patient from being aware of the sawing of bone.
9. Herniotomy. In addition to providing an easy and safe anæsthetic for the radical cure of hernia, spinal anæsthesia diminishes the risk of the post-operative cough which is particularly undesirable in such cases.

PREMEDICATION AND "COMBINED" ANÆSTHESIA

Consciousness is undoubtedly the greatest disadvantage of spinal anæsthesia. Many attempts have been made to overcome this by varieties of premedication. A small dose of a basal narcotic combined with spinal anæsthesia promised to be an ideal combination from the point of view of both patient and surgeon.

It has been found, however, that such a combination is too dangerous to be used in other than very exceptional cases. All preliminary narcotic drugs (except in very small doses) enhance the danger of central respiratory failure or fall in blood pressure under spinal anæsthesia. My own procedure is to limit preliminary narcotics to the administration of morphia gr. $\frac{1}{6}$ forty minutes before operation. This is accompanied by ephedrine grs. 1½, and I would stress the importance of administering ephedrine not less than twenty minutes before the time for the spinal injection. The object of this injection is to combat the fall in blood pressure caused by spinal anæsthesia. The technique commonly used is to administer a subcutaneous injection of ephedrine in novocain solution at the site and time of the lumbar puncture. This procedure is useless, as the subsequent subarachnoid injection paralyses the vasoconstrictors long before the ephedrine has had any chance to be absorbed from the subcutaneous tissue and exert its specific effects.

For "combined" anæsthesia gas-and-oxygen is certainly the best, but very light chloroform anæsthesia is preferable to ether, as the "midwifery" type of anæsthesia will suffice. True combined anæsthesia means that in which the inhalation anæsthesia is given purely to abolish consciousness, and not the disaster which sometimes occurs in everyone's practice of a "failed" spinal anæsthetic. Unfortunately, and for some entirely inexplicable reason, a patient with a "failed spinal" always requires far more general anæsthetic to become adequately relaxed than if no previous attempt had been made at subarachnoid block.

PRACTICAL POINTS

The first important point is to ascertain that the spinal anæsthetic is working satisfactorily.

No attempt should be made to test the efficiency of the anæsthetic upon any site which is not expected to be fully anæsthetised, or before sufficient time has elapsed after injection for anæsthesia to have developed. If a patient is once hurt the confidence of that patient is destroyed and is seldom completely regained. When testing anæsthesia, a sharp-pointed towel clip is the most satisfactory instrument to use. The patient should never be asked if he can feel anything or be allowed to see any test being performed, but the anæsthetist must watch carefully the patient's face. Imperfect anæsthesia will be shown immediately by a contraction of the orbicularis palpebrarum and, if very imperfect, the patient will screw up his entire face when stimulated. Anæsthesia does not develop at the same rate in every patient, and impatient surgeons must be firmly persuaded to give it a fair chance to develop. I have seen anæsthesia develop as long as 12 minutes after the injection of stovaine instead of the more usual 3–5 minutes.

The eyes of the patient should be kept covered during the operation, and with modern theatre lighting the screen alone is often insufficient to prevent the patient from developing a visual interest in the proceedings. Care must be taken to ensure that the eye-covering leaves the nose and mouth quite free.

As soon as the anæsthetic solution is considered to be "fixed," some degree of Trendelenburg position should be adopted in order to combat any tendency to cerebral anæmia resulting from fall in blood pressure. A small point is that if the operation necessitates a steep degree of Trendelenburg position, the wrists should be slung before the operation begins, as patients always complain that their arms are very uncomfortable when unsupported. Nausea or vomiting is best combated by the application of cold water to the forehead, and by instructing the patient to breathe deeply with the mouth wide open.

It should not be necessary to remind surgeons that the unanæsthetised chest of a conscious patient is not an ideal receptacle for heavy instruments, or that a patient should not be treated to a discourse on the state of his abdominal contents during their actual evisceration; but it is surprising how often these small points are neglected, although attention to them ensures that the operation is carried out with the minimum of discomfort to the patient.

CALCIFICATION AND OSSIFICATION IN THE SEMILUNAR CARTILAGES

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In a recent number of the *British Journal of Surgery* two contributors have drawn attention to cases of ossification in the semilunar cartilage of the knee-joint. Two cases of ossification in the *internal* semilunar cartilage are described by H. J. Burrows,[1] and the condition is described as "a rarity bearing on the metaplastic formation of bone." Watson Jones and R. E. Roberts,[2] describing two cases of ossification in the *external* semilunar cartilage, state that this condition of ossification has not been hitherto described as distinct from the calcification described by Mandl and other observers.

In such clinical cases it is advisable to search to what extent, if any, normal anatomical parallels can be found in the domestic animals for conditions which are regarded as pathological in man. All animals which have a poor degree of conformity between the articulating surfaces of the tibia and femur have semilunar cartilages. They reach their highest development in man, the primates, and standing birds, such as the crane or stork. They are partly or totally suppressed in such forms as the bats which hang by their thumbs instead of perching or standing on their legs. The discs are developed in proportion as the knee-joint exhibits rotatory and sliding movements as distinct from mere flexion and extension. Whereas the internal disc is usually C-shaped, the external disc may vary from an incomplete annulus as in man to an almost complete disc as in the baboon, chimpanzee, and gorilla. An external cartilage in the form of a complete disc has been described in man by Duncan[3] and others.

As regards the function of the discs MacConaill[4] has pointed out how, with poor approximation of articulating surfaces, the disc, by its wedge-like cross-section, facilitates the early stages of movement. MacConaill has rightly associated this with the condition described by engineers in relation to lubrication. During the first phases of movement at any bearing surfaces a wedge-like film of oil of uneven thickness is more desirable between bearings than a film of equal thickness.

If the mode of formation of interarticular cartilages in the embryo be considered, a complete view is obtained of the structural changes which such discs may undergo. All interarticular discs are persistent portions of the original mesenchyme of the skeleton of the limb. There is no evidence for the view put forward by Bland-Sutton[5] that any extra-articular structure, such as tendon, ever contributes to the interarticular disc. A diarthrodial joint, such as an interphalangeal joint, is formed by localised absorption of the core of embryonic mesenchyme so as to demarcate the articular ends of the bone. In any diarthrodial joint with a disc two areas of absorption occur in close proximity, the intervening mass constituting the disc. The degree of absorption determines whether the disc shall be complete, as in the jaw, wrist, and sternoclavicular joints, or incomplete, as in the knee and acromioclavicular joint. Early stages of the demarcation of joints, with and without discs, are illustrated in “ Bone Growth in Health and Disease[6] (figs. 51-54). A later stage, at the knee-joint of the new-born rat, is shown (Fig. 1) to illustrate the histological identity of the two menisci with the cartilaginous ends of the bones. Afterwards, in the rat of about six weeks, the meniscus (Fig. 2) displays characteristic age changes in the cartilage. Near the joint capsule the tissue is essentially fibrous; near the periphery of the joint surfaces of the disc the tissue becomes more fibrocartilaginous both in terms of cells and fibres. At the centre of the disc the cartilage cells hypertrophy and become senescent. The matrix begins to calcify.

Some time later (Fig. 3) the mass of cartilage in the disc has reached such dimensions that it can no longer continue to live as cartilage proper. The problem of nutrition at the centre has become acute. The cartilage cells die, the matrix calcifies, and vessels from the capsule invade the zone. By a process which has much in common with aseptic inflammation, virtually dead calcified avascular senescent cartilage is replaced by vascular bone. At the periphery of the disc a narrow rim of cartilage persists which resembles in structure the hyaline cartilage near the articulating surfaces of the femur and tibia. This section (Fig. 3) shows very clearly a *fringe of synovial membrane* between the femur and tibia—a process of the ligamentum mucosum running from the infrapatellar pad of fat to the intercondyloid notch.

The relatively stable condition of the meniscus in the adult rat (Fig. 4) presents a disc in which a core of bone and marrow is surrounded by a narrow rim of calcified cartilage and a wider rim of cartilage which becomes more fibrous towards the free surface.

These progressive changes from undifferentiated mesenchyme to cartilage, fibrocartilage, calcified cartilage, and bone on the one hand, as in the rat and guinea-pig, or the change from cartilage to persisting fibrocartilage as in man, focus attention on the mode of nutrition of cartilage. Cartilage is essentially an avascular tissue in which the nutrition is carried on by imbibition of tissue juice. As in the case of a gumma or tubercle there is a limit to the size of such an avascular mass. Once this size is surpassed, the

FIG. 1

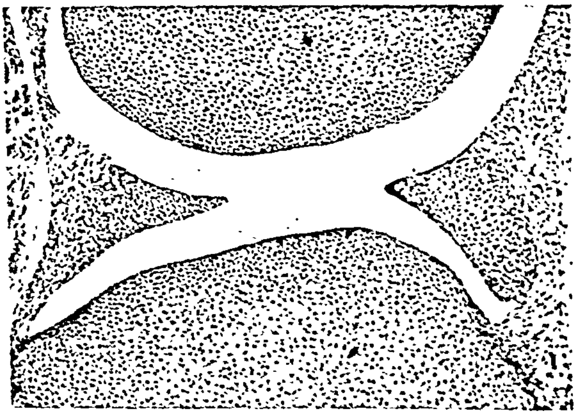


FIG. 3

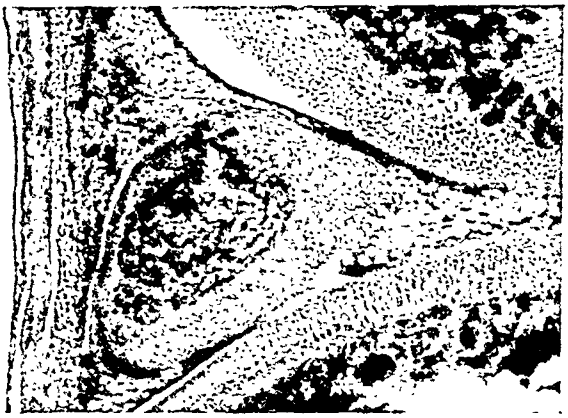


FIG. 2

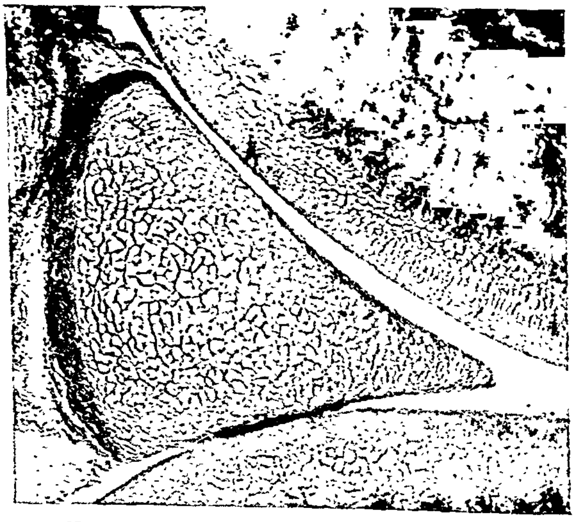
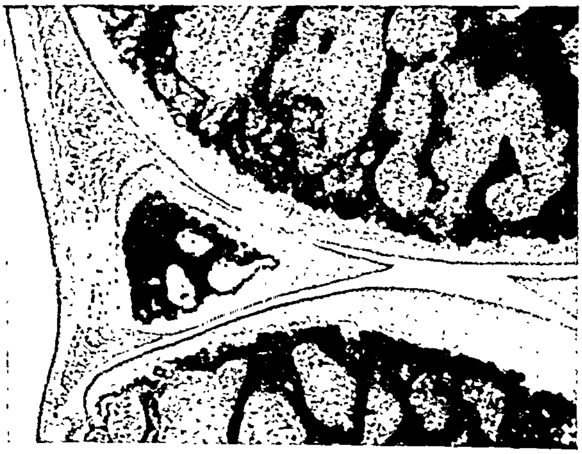


FIG. 4



FIGS. 1–4.—Longitudinal sections of the knee-joint of the rat: (1) at birth (× 300); (2) at 6 weeks (× 130); (3) at 10 weeks (puberty) (× 155); (4) at 16 weeks (adult) (× 100).

cells at the centre undergo death with degeneration of the matrix, which may be either mucoid, fatty, or hyaline, and may be accompanied by calcification. Such calcified tissue may be replaced by bone. The intervertebral fibrocartilaginous discs of adult man, the mass of cartilage at the lower end of the femur in the new-born, the fibrocartilages of the ear and those of the larynx represent these limits of size. Whereas epiphysial cartilage, like diaphysial cartilage, undergoes calcification and ossification from within, fibrocartilages usually undergo calcification from without, on the free surfaces. This is shown by the laryngeal cartilages which in old age show small plaques of calcification on their surface, as is the case with the costochondral cartilages in old age or chronic respiratory disease.

The above facts should serve to distinguish between types of calcification and ossification in fibrocartilage. If the calcification and ossification is central in cartilage, it is usually part of the normal nutritional progression. If calcification occurs on the surface of a fibrocartilage it is essentially senile, allowing that such senility may be precocious as in the laryngeal and costal cartilages of patients with chronic bronchitis and emphysema.

If calcification and ossification occur in the centre of a mass of fibrocartilage it is usually consequent upon a localised zone of mucoid degeneration. Mucoid cysts of the semilunar cartilage, particularly of the external weight-transmitting disc, are not infrequent. Such areas of mucoid degeneration may undergo calcification and ossification as I have described[6] in conditions ranging from achondroplasia to stippled epiphyses.

This brief note has been written in order to warn the clinician and radiologist that calcification, or ossification, in the semilunar cartilages is not necessarily the cause of the derangement of the joint for which the patient seeks advice. If the calcified or ossified mass reaches such a size as to interfere with the surface contour of the disc then presumably symptoms must arise.

When Karl Pearson[7] undertook his intensive studies on sesamoid bones in man, he not only described calcified or ossified areas in the "fabella" of the external head of the gastrocnemius, but also in the tendon of the popliteus, and in the semilunar cartilages. He invented the term "lunules" to describe these small masses of calcified or ossified tissue in the semilunar cartilages, and it is suggested that the term, in view of the comparative anatomical significance, should be maintained, together with his designation of the sesamoid in the popliteus tendon as "cyamella."

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CLINICAL AND LABORATORY NOTES

THE EFFECTS OF COMMON SALT IN ADDISON'S DISEASE

RECORD OF A CASE

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The work done in recent years on the inorganic bases of the blood-serum in adrenalectomised animals was the subject of editorial comment in The Lancet (Jan. 20th, 1934, p. 137). In this connexion Loeb, among others, has shown a constant fall in the sodium content of the blood-serum in such animals. Further, he has found it possible not only to keep adrenalectomised animals alive by administering sodium chloride, but has also applied this treatment to patients suffering from Addison's disease with encouraging results. This is a matter of the greatest importance, since the present cost of potent cortical adrenal extract makes its general use impossible, and no other treatment has hitherto been found to give any relief in these distressing cases.

It seems desirable at this stage to record the result of treatment with sodium chloride even of isolated cases of Addison's disease. The following is a brief record of a case recently under my care in St. Bartholomew's Hospital, in which the findings differed strikingly from those reported in The Lancet of May 5th (p. 950) by Dr. W. Gordon Sears:—

A. B., a man aged 40, was admitted on Feb. 14th last, complaining of extreme exhaustion, nausea, and vomiting. He had noticed a peculiar pigmentation of his skin since August, 1933. Further symptoms began in November, 1933, characterised by weakness and lassitude, anorexia, dyspnœa on slight exertion, and œdema of the ankles, which he noticed at the end of the day. The symptoms had been steadily progressive. He had lost about 4 st. in weight.

His past history was unimportant and there was no history of tuberculosis in the family.

His pigmentation had the characteristic distribution and was well marked on the buccal mucous membrane. The area of cardiac dullness was much reduced and X ray examination of the chest showed the heart to be unusually small. The exact measurements were not ascertained by the orthodiagraphic method. The sounds were very faint, but otherwise normal. His pulse was regular, of small volume, and obviously of poor tension; rate 110 per minute. The blood pressure varied between a minimum of 60/40 mm. Hg and a maximum of 78/48 mm. Hg whilst he was under observation. There was no tenderness in either loin and no enlargement of the liver or spleen. The urine was acid; the specific gravity was 1012; it contained a trace of albumin. There were no other abnormal constituents. The Wassermann reaction was negative in the blood. His blood count on admission was: R.B.C., 4,700,000; W.B.C., 11,600; Hb., 81 per cent.; C.I., 0·86. There was a lymphocytosis present, with a polymorphonuclear leucopenia, the differential count showing polymorphs 3074, large lymphocytes 4698, small lymphocytes 2900 (total lymphocytes 7598). No abnormal cells were present in the blood film. Fasting blood-sugar was 80 mg. per cent. The blood sodium, estimated by Dr. G. A. Harrison, was 298 mg. per cent., which is the equivalent of 130 millemolecules. A control on healthy blood donors gave 324 mg. per cent. and 328 mg. per cent.; a patient with renal calculi gave 336 mg. per cent., and a man with ? sprue 346 mg. per cent.

The man's condition during his first week in hospital remained substantially unchanged. On Feb. 23rd, at the suggestion of Dr. George Graham, he was put on 10 g. of sodium chloride daily. This was given in 2 g. doses in milk. The patient experienced no difficulty in taking it. The effect of this treatment was most dramatic. After 24 hours the patient, instead of lying listless and apathetic as he had for the previous week, was sitting up looking at an illustrated paper. His nausea disappeared and his appetite improved at once. This improvement was maintained, and on March 7th the patient was allowed up. He stated that "he had not felt so well for months." The improvement was entirely subjective, as the blood pressure showed no rise, and the pigmentation remained entirely unaltered. On March 15th the daily dose of sodium chloride was reduced to 5 g. without the patient's knowledge. By March 26th he complained of feeling weak, lost his appetite, and vomited several times. The dose of sodium chloride was then doubled, again with an immediate improvement. The patient left hospital on April 5th. His blood pressure was unchanged, being 75/45 mm. Hg. His pulse-rate fell during his stay in hospital from 110 per minute on admission to 90 to 100 per minute when he was discharged.

Dr. Harrison estimated the blood sodium and found it to be 301 mg. per cent. on March 9th, when the man had been on sodium chloride 14 days. On March 19th, after four days of reduced sodium chloride (5 g.), the blood sodium was 315 mg. per cent. Unfortunately an estimation was not made of the blood sodium when the patient relapsed a few days later. It is remarkable that the blood sodium showed the highest reading when he was on half doses of sodium chloride.

During the period in which the patient was taking 10 g. of sodium chloride daily the hæmoglobin percentage in the blood fell steadily. It was 74 per cent. on Feb. 23rd, the day the treatment began, and had fallen to 65 per cent. by March 12th, although the patient was gaining strength and energy daily. During the period in which 5 g. only of sodium chloride were taken the hæmoglobin percentage rose again to 74 per cent. on March 20th and 84 per cent. on March 23rd. As was pointed out in the article in THE LANCET already referred to, it would appear that the adrenal controls the blood sodium, and that in Addison's disease there is a sodium leak from the body. Treatment with sodium chloride is obviously not in any way curative, but by supplying an excess, to some extent makes good the wastage.

The main differences between the case reported by Dr. Sears and my own are that in his case (1) the blood pressure was never really low and increased when a comparatively small amount (5 g.) of salt was being taken daily; and (2) the sodium in the blood-serum was very low (248 mg. per cent.) and rose with the small amount of salt to 452 mg. per cent.; whereas in my case the taking of sodium chloride caused only a very small rise in the serum sodium, although the man's symptoms improved enormously.

FRACTURE OF A SESAMOID BONE

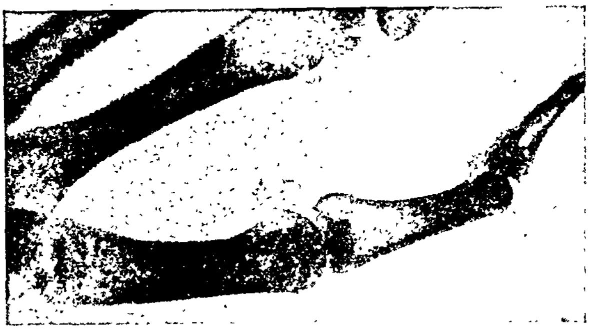
BY THOMAS STREATFEILD, M.D. Durh.

AND

H. F. GRIFFITHS, M.D. Camb.

IN view of the rarity of uncomplicated fracture of the sesamoid bones, the following case appears to be of interest.

The patient, a healthy schoolgirl aged 15, was seen by us together in June, 1933. She gave the history that whilst jumping a "horse" during gymnasium her right hand "got left behind," and she twisted her thumb. She was seen about one hour after this occurrence, when there was swelling and severe pain in the region of her metacarpo-phalangeal joint. A diagnosis of fracture of the metacarpal bone into the joint was made. Upon X ray examination it was found, however, that the sesamoid bone at the head of the metacarpal was fractured (see Figure). The left hand showed a normal sesamoid. The thumb was put up in full flexion and secured to the palm of the hand with strapping. It was kept in this position for five weeks, and a perfect functional result was obtained.



Fracture of sesamoid bone at metacarpo-phalangeal joint of thumb.

We are indebted to Dr. A. C. Rusack for his excellent radiograms.

Folkestone.

BILATERAL EMPYEMA

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F.R.C.S. Eng.

HON. ASSISTANT SURGEON TO THE SALFORD ROYAL HOSPITAL

BILATERAL empyema is an uncommon condition and a rarity in the adult. Keyes [1] defines it as a condition in which pus is found in both pleural cavities at or about the same time and points out that it is most frequently met with in association with broncho-pneumonia—for example, during the influenzal epidemics of 1917–19. The case records since 1910 number 69 (Steinke [2]), and three-quarters of the patients are less than 12 years old (Keyes). The example reported here possesses additional interest in that the fatal outcome may be attributed to a pneumococcal infection of the urinary tract.

The patient, a man 26 years of age, became suddenly ill on April 1st, complaining of a severe pain in the chest; compelled to return home from business he coughed up sputum tinged with bright red blood and the diagnosis made by his medical attendant was that of a left-sided pleuro-pneumonia. After a crisis the temperature became irregular and an extending dullness of the left side of the chest was found whilst on the right a well-marked area of paravertebral dullness appeared. He was admitted to hospital on April 16th, dyspnœic and with a very irritating cough; dullness on the left side reached the fifth rib in the midaxillary line. Sixteen ounces of thick greenish-yellow pus were aspirated and from this the pneumococcus type I. was isolated. The X ray findings appear in Fig. 1. Aspiration was performed again on April 19th, and 25 ounces of pus evacuated. On the 21st a rib was resected on the left side and closed drainage established which remained airtight for six to seven days. The dullness of the right side was, however, extending and on April 25th 15 ounces of pus similar to that found on the left side were aspirated; aspiration was again carried out on the 28th and on May 1st, and, respectively, 14 and 25 ounces evacuated. On May 2nd a self-retaining catheter was introduced into the right side through a trocar and cannula and continuous aspiration and irrigation as described by McEachern [3] commenced.

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[1] Keyes, E. L.: Ann. of Surg., 1931, xciii., 1050.
[2] Steinke, C. F.: Jour. Thorac. Surg., 1933, ii., 287.
[3] McEachern, J. D: Brit. Jour. Surg., 1933, xx., 653

Progress was satisfactory until May 8th, by which time drainage from the right side had decreased from an original 40 ounces to 12 ounces per diem. However, on this date the temperature rose to 103·6° and the patient became very ill. The temperature fluctuated between 101° and 104° for seven days, after which death occurred. During this period no pocket of pus was found either by X rays (Fig. 2) or by the exploring needle which was used only on the left side as the right appeared clear on X ray examination. Post mortem a needle again failed to find pus in the thorax after careful search. Three days before death the urine was observed to be turbid and there was frequency of micturition; the day before death symptoms of cystitis were prominent, frequency of micturition was marked and associated with hypogastric and penile pain. The urine on microscopical examination contained numerous pus cells and on culture the pneumococcus type I. was identified.

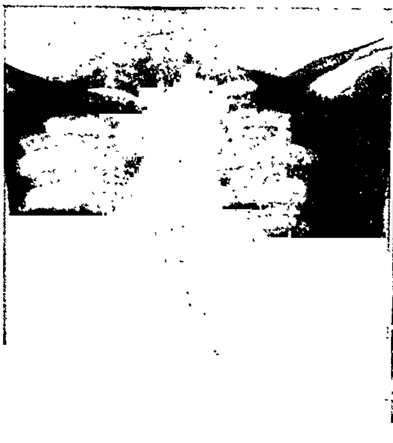

FIG. 1.—Before operation. Consolidation of both lower lobes and on the left side the shadow of a parietally situated empyema.

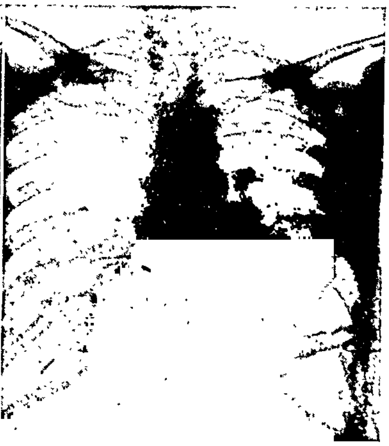

FIG. 2.—After operation. On the left side the drainage-tube is seen and on the right the catheter.

As regards the treatment of a bilateral empyema the first essential is the avoidance of a bilateral open pneumothorax during the early stages, and consequently open drainage is contra-indicated because further depletion of an already seriously diminished vital capacity in an exhausted patient is fatal. Therefore, guided by the condition of the individual patient, either aspiration alone of each side or closed drainage of one with aspiration of the other is the procedure of choice. Later in the disease when adhesions are firmly established bilateral drainage may be instituted; time should always be allowed for adhesions to become firm on the side first opened before operating on the second side.

In the patient recorded above McEachern's technique of continuous aspiration proved eminently satisfactory on the right side (Fig. 2), and I shall employ this method on both sides if another case presents itself.

MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

SUBSECTION OF PROCTOLOGY

At a meeting of this subsection held on May 16th, the chair was taken by Mr. W. E. Miles, the president, and a discussion on the

Treatment of Cancer of the Colon

was opened by Dr. F. W. Rankin (Kentucky). He based his surgical attack, he said, on physiological and embryological considerations, remembering that the colon was a dual organ. In most cases the problem offered by cancer was a chronic one which undermined vitality by a subintoxication. Measures therefore were preoperative, operative, and postoperative. The fundamental preoperative procedure was decompression, which might be accomplished in three to six days by surgical or by medical measures (saline irrigation and purging). Cæcostomy was the operation of choice, especially by Hendon's method. Rehabilitation was accomplished at the same time by giving a diet high in calorie value and low in residue (sugars and fruit juices), and by blood transfusions, which were very valuable. Transfusion should not depend on the existence of anæmia, but could well be used as a routine. He was doubtful of the value of routine vaccine; he had used streptococci and colon bacilli from fatal cases and thought it a useful step in rehabilitation and control of subsequent peritonitis, but it was not to be recommended as an alternative to other measures. Some old principles might well be re-emphasised: multiple-stage procedures; measures which did not call for primary sutures in the left colon; and aseptic end-to-side anastomosis, to by-pass the fæcal current, between the terminal ileum and the middle of the transverse colon, for right-sided growths. If a one-stage resection was decided on, it should be supplemented by an enterostomy proximal to the suture line. Obstruction might be due to œdema and infection, apart from any faulty technique, and might be fatal.

Dr. Rankin showed slides illustrating the technique he preferred for Mikulicz's operation, which he regarded as the third choice. The mortality had been much lower in his hands than any other left-sided procedure, but it must be preceded by adequate decompression. He also showed prognosis figures from a review of nearly 400 cases. They showed forcibly that Broders's index of malignancy was the most important yardstick for prognosis. Other factors influenced the result, but the grading was of primary significance. Glandular involvement followed the grade grouping. In his series glandular involvement was rather more frequent on the right side, but this side nevertheless showed a higher percentage of five-year cures than the left. Cancer of the rectum showed much more frequent metastasis. The five-year cure figures for the four groups were 63 per cent., 51 per cent., 31 per cent., and 24 per cent. respectively.

Dr. Rankin finally showed a cinematograph film of an end-to-side ileo-colostomy.

Sir Charles Gordon-Watson expressed agreement with Dr. Rankin's principles. In few surgical fields, he said, did judgment and experience play a larger part. In his experience many cases which at first sight seemed inoperable could be attacked after careful mobilisation. This variation made it difficult to assess statistics. Surgeons should aim at a high operability-rate, while trying to reduce the inevitably high mortality-rate that must accompany it. He showed figures from two series of cases. They showed the advantage of increased experience. In his later series the mortality for resections was 8 per cent., omitting one pulmonary embolism, and the operability-rate 63 per cent. The five-year survival-rate was, however, only 33 per cent. In the first series the operability-rate had been 57 per cent. and the mortality 20 per cent. Anæsthesia had been improved, and the enormous value of pre- and post-operative blood transfusion must be emphasised. "Drainage first" spelt safety first. A primary resection was, of course, never justifiable in the presence of obstruction, and every patient with a growth in the distal colon was potentially obstructed. A side-to-side anastomosis could seldom be done in the pelvic colon, but was usually possible in other parts and was much safer than end-to-end. There was less risk of gaseous distension and subsequent contraction.

Exteriorisation operations should be ascribed to Paul, of Liverpool, rather than to Mikulicz. Their advantages were inestimable. He was accustomed in cæcostomies to bring the tube through a portion of great omentum and then to fix to the abdominal wall. A safety-valve should always be used, to avert gas distension. Large hypertrophic growths often produced a lot of large glands, but the end-results were better than in the small scirrhous type as the glands were generally inflammatory and not malignant. Far less risk should be run in colloid cases, for few survived more than a few years, however good the surgery. He had tried in 1911 to immunise the peritoneum with vaccines, but had given it up, as he had found no marked benefit, and two successive vaccinated cases had died of streptococcal peritonitis. Animal experiments were needed on this subject. He was sure that better results could be obtained in the future, especially when more was known about the diathermy knife. There were possibilities in radium and X rays for advanced cases. With the million-volt X ray apparatus or the heavy bomb it would become possible to irradiate exposed growths. In ten years' time the mortality-rate would be down to about 5 per cent.

Mr. J. P. LOCKHART-MUMMERY also agreed with Dr. Rankin. One of the greatest points of all, he said, was preliminary decompression. Multiple-stage operations were of the greatest value. After colon anastomosis an elbow of small gut was apt to get caught up against the suture and acute obstruction resulted. He therefore stitched omentum or some other form of fat round the anastomosis. The most difficult cases were those of carcinoma in the lower end of the pelvic colon. The method he had suggested—a tubular resection—worked in some cases but was highly dangerous owing to the unsatisfactory blood supply to the part. It was important to stitch the arms of colon together carefully in Paul's operation so that no mesentery could get between the ends and so get caught in the clamp.

Mr. G. GORDON-TAYLOR said he was more inclined to perform Paul's operation than he had been five years ago. In fat patients suturing was difficult, and mobilisation carried with it no mortality: he had only lost one case. In easy cases end-to-end or lateral anastomosis was satisfactory, but always a cæcostomy was worth doing. In most cases there was no evidence of hepatic or peritoneal involvement; in this event it was worth while dealing radically. He had removed parts of the abdominal wall, stomach, and other viscera, and his temerity had been rewarded by long survival.

Mr. LAWRENCE ABEL thought that blood transfusion had lowered mortality, and recalled Mr. Wilfred Trotter's advice that when a growth was anastomosed it should be extra-peritonealised. He described his technique for effecting this, and expressed satisfaction with the Rankin clamp. Another way of preventing post-operative distention was to give continuous intravenous saline for two, three, or five days.

Mr. W. B. GABRIEL disagreed on the necessity for a cæcostomy; he thought that the old-fashioned Paul's operation could be done with perfect safety provided the proximal bowel was drained.

Dr. RANKIN briefly replied.

REVIEWS AND NOTICES OF BOOKS

The Queen Charlotte's Textbook of Obstetrics

Third edition. By ALECK W. BOURNE, TREVOR B. DAVIES, L. CARNAC RIVETT, L. G. PHILLIPS, C. S. LANE-ROBERTS, and LESLIE H. WILLIAMS. London: J. and A. Churchill. 1933. Pp. 679. 18s.

As a manual of practical obstetrics this book is admirable. The teaching is clear and dogmatic, and the division into short paragraphs with frequent headings makes it one of the most readable of text-books, and eminently suitable for the student. In physiology and pathology the information given on some subjects is rather meagre; for instance, very little is said about the physiology of the placenta, or the pathology of placental infarction.

The section on puerperal pyrexia and sepsis is especially good, embodying as it does the experience which the staff have gained at the new isolation block of the hospital. A chapter on the technique and results of vaccination is an unusual and very useful feature in an obstetric text-book. In the chapter on antenatal care stress is laid on the necessity for frequent urine examinations during pregnancy, but not on the greater importance of blood-pressure estimation, which is now recognised to be often an earlier sign of toxæmia. The section on cardiac disease is not so good as the purely obstetric parts, and would benefit from revision by a cardiologist. Obstetric operations are well described and illustrated, but the lower segment Cæsarean section, which is becoming increasingly important, requires detailed description.

The practitioner will find this book a full and reliable guide to obstetric treatment. Both student and practitioner will appreciate the sound advice offered on obstetrical diagnosis and treatment.

Eye, Ear, Nose, and Throat

By E. V. L. BROWN, M.D., Professor of Ophthalmology; LOUIS BOTHMAN, M.D., Associate Professor of Ophthalmology; GEORGE E. SHAMBAUGH, M.D., Professor of Otology; and ELMER W. HAGENS, M.D., Instructor in Otology. With the collaboration of GEORGE E. SHAMBAUGH, Jr., M.D., Clinical Assistant in Otolaryngology, University of Chicago. Chicago: The Year Book Publishers. 1933. Pp. 632. 11s. 6*d*.

As in previous years, this annual consists of abstracts from the current literature in these specialties of the previous 12 months; the papers abstracted have been selected with discretion from world-wide sources and have been skilfully summarised. In many cases editorial comments have been added which, though inclined to be dogmatic, are always shrewd and to the point. Of outstanding interest is the description by Dr. A. B. Duel of 12 cases of facial palsy operated on by the method developed by Sir Charles Ballance and himself; this consists in placing an autoplastic nerve-graft in the exposed Fallopian canal, and his description of the technique is so clear that it may be undertaken by any aural surgeon. He contends that the operation should be performed whenever facial palsy follows immediately the mastoid operation, and that a suitable graft introduced without delay gives assurance of a quick recovery. The abstracts cover a very large field, and this year's volume, like the former numbers, is a valuable work of reference. A good index of authors and of subjects is supplied.

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he staggers perceptibly and sings loudly; with 3 mg. he sleeps and vomits by turns, and with 4 mg. he is in deep anæsthesia. Mr. Emerson's conditions for the permissible use of alcoholic beverages are as follows: he recommends everybody responsible for the safety or lives of others to avoid it altogether and advises healthy adults of sound nervous system to limit themselves to beverages with a content of less than 10 per cent., taken slowly, at or after meals. The book can be recommended as a skilful compilation of facts concerning alcohol in small compass, couched in language which is perhaps rather too technical for the audience he addresses.

The Toxicology of Plants in South Africa

Together with a consideration of Poisonous Foodstuffs and Fungi. By DOUW G. STEYN, B.Sc., Dr. Med. Vet. Vienna, D.V.Sc., Head of the Department of Pharmacology and Toxicology, Onderstepoort Laboratories, Transvaal. London: Gordon and Gotch, Ltd.; South Africa: Central News Agency Ltd. 1934. Pp. 631. £2 7*s.* 6*d.*

ONE of the chief difficulties confronting the veterinary toxicologist is the fact that our knowledge of the active principles of plants and of their pharmacological action is limited to the relatively small number of species used in medicine or cultivated or exploited for other purposes. This work is thus welcome, for it collects under one cover much data concerning the South African flora which is known to be particularly rich in poisonous plants of potential danger to cattle and other browsing animals. The study of plant poisons is complicated by the fact that the toxicity of a plant may be influenced by the soil and climatic conditions under which it is growing, quite apart from the fact that many plants only secrete their poison in certain organs and at certain stages of their growth. Further, the susceptibility of different animals to the same poison varies considerably, and the tolerance of an individual animal may be influenced by its colour in cases of photosensitisation. Added to this is the fact that some plants such as Sorghum or Lathyrus, which are recognised fodder crops, may become toxic under certain climatic conditions or if fed in large quantity.

The general principles indicated above are dealt with systematically by the author, together with such subjects as the diagnosis and prognosis of plant poisons, the eradication of poisonous plants and the prevention of plant poisoning, and the reasons for negative or positive results in experiments with suspected plants. Then follow sections on poisonous foodstuffs, photosensitisation, food rashes, and fungi in relation to health in man and animal. The major portion of the book is, however, devoted to the section entitled Poisonous Plants, which provides a systematic description, with many illustrations, of the various toxic plants, giving their names in English and Afrikaans and very frequently also their native names, together with an account of the active principle, where known, and the symptoms, treatment, and post-mortem appearance of the victim. The inclusion of a large number of references enhances the value of the book, making it of interest not only to those concerned with South African veterinary problems but to workers in all parts of the world.

EUGENICS IN PRACTICE

A Series of Essays suggested by the Report of the Brock Committee

III.—INHERITANCE OF MENTAL DEFECT

THE rôle of heredity in the causation of mental defect has long been a fertile source of controversy. During the last few years two aspects of the problem have especially been discussed: (1) How is mental defect transmitted? (2) How much mental defect is hereditary? The first question is mainly biological and has no immediate sociological importance; the second has important sociological implications.

HOW IS MENTAL DEFECT TRANSMITTED?

Fifteen years ago, when Mendelian principles were being applied wholesale to the transmission of all human infirmities, it was commonly stated that mental defect in general was the product of a single recessive Mendelian factor or gene. This view has been substantiated in respect of two rare types of amentia, amaurotic family idiocy[1] and a type of defectiveness described by Sjögren in a circumscribed area in Northern Sweden.[2] Here it was shown that 52 cases, occurring in 34 families, were all related to each other. The demonstration of consanguineous marriages in the ancestry is important in establishing that a rare abnormality is the product of a recessive gene.

But so far as the bulk of mental defect is concerned, it is now certain that this hypothesis does not hold. It does not, however, follow that, because the inheritance of an abnormality does not accord with simple Mendelian ratios of dominance, recessivity, or sex-linkage, the mode of its transmission does not conform with Mendelian principles. The fact has frequently been noted that mental defect occurs, apparently haphazard, in pedigrees wherein appear an excess of other abnormalities such as insanity, epilepsy, psychoneurosis, alcoholism, and sometimes suicide. To account for this so-called polymorphism, the doctrine of blastophthoria* or germ vitiation has been advanced. According to this, the gametes are exposed to damage from toxins or other noxious agencies which, while not impairing their viability, are capable of producing "polymorphic" abnormalities in later generations. This view derived much support from the papers of Stockard[3] according to which the descendants of alcoholised guinea-pigs exhibited weakness and deformities up till the fourth generation as compared with control litters. His experiments were, however, repeated later by Durham and Woods[4] with entirely negative results. But Stockard's findings provided propagandist ammunition though inclined to be dogmatic, are always shrewd and to the point. Of outstanding interest is the description by Dr. A. B. Duel of 12 cases of facial palsy operated on by the method developed by Sir Charles Ballance and himself; this consists in placing an autoplastic nerve-graft in the exposed Fallopian canal, and his description of the technique is so clear that it may be undertaken by any aural surgeon. He contends that the operation should be performed whenever facial palsy follows immediately the mastoid operation, and that a suitable graft introduced without delay gives assurance of a quick recovery. The abstracts cover a very large field, and this year's volume, like the former numbers, is a valuable work of reference. A good index of authors and of subjects is supplied.

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[1] von Torsten Sjögren: Hereditas, 1930–31, xiv., 3.

[2] Idem: Acta psychiat. et neurolog., Suppl. II., 1932.

* The term blastophthoria was first used by Forel, and is in many respects unsatisfactory. The word βλαστός means a shoot or sucker; also a child. It therefore *suggests* a somatic structure rather than a germ cell, and this implication is borne out by its use in such words as blastoderm and erythroblast. The word φθορία means corruption or mischief. The word blastophthoria therefore implies an agency which damages the fœtus rather than the germ cell. The word has suffered from being written by many psychiatrists as "blastophoria." To leave out the "th" is a solecism equivalent to omitting it in such words as diphtheria or ophthalmology, and indeed entirely changes the meaning of the word. The word phoria, as in euphoria, is derived from φέρω, I bear, and the word blastophoria, as commonly used, should therefore mean the process of carrying something embryonic, as does the pregnant uterus. Psychiatry would suffer no harm if the word were dropped altogether.

[3] Stockard, C. R.: Am. Nat., 1916, xlvii., 641.

[4] Durham, F. M., and Woods, H. M.: Med. Res. Coun., Special Report No. 168, 1932.

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The Toxicology of Plants in South Africa

Together with a consideration of Poisonous Foodstuffs and Fungi. By DOUW G. STEYN, B.Sc., Dr. Med. Vet. Vienna, D.V.Sc., Head of the Department of Pharmacology and Toxicology, Onderstepoort Laboratories, Transvaal. London: Gordon and Gotch, Ltd.; South Africa: Central News Agency Ltd. 1934. Pp. 631. £2 7*s.* 6*d.*

ONE of the chief difficulties confronting the veterinary toxicologist is the fact that our knowledge of the active principles of plants and of their pharmacological action is limited to the relatively small number of species used in medicine or cultivated or exploited for other purposes. This work is thus welcome, for it collects under one cover much data concerning the South African flora which is known to be particularly rich in poisonous plants of potential danger to cattle and other browsing animals. The study of plant poisons is complicated by the fact that the toxicity of a plant may be influenced by the soil and climatic conditions under which it is growing, quite apart from the fact that many plants only secrete their poison in certain organs and at certain stages of their growth. Further, the susceptibility of different animals to the same poison varies considerably, and the tolerance of an individual animal may be influenced by its colour in cases of photosensitisation. Added to this is the fact that some plants such as Sorghum or Lathyrus, which are recognised fodder crops, may become toxic under certain climatic conditions or if fed in large quantity.

The general principles indicated above are dealt with systematically by the author, together with such subjects as the diagnosis and prognosis of plant poisons, the eradication of poisonous plants and the prevention of plant poisoning, and the reasons for negative or positive results in experiments with suspected plants. Then follow sections on poisonous foodstuffs, photosensitisation, food rashes, and fungi in relation to health in man and animal. The major portion of the book is, however, devoted to the section entitled Poisonous Plants, which provides a systematic description, with many illustrations, of the various toxic plants, giving their names in English and Afrikaans and very frequently also their native names, together with an account of the active principle, where known, and the symptoms, treatment, and post-mortem appearance of the victim. The inclusion of a large number of references enhances the value of the book, making it of interest not only to those concerned with South African veterinary problems but to workers in all parts of the world.

EUGENICS IN PRACTICE

A Series of Essays suggested by the Report of the Brock Committee

III.—INHERITANCE OF MENTAL DEFECT

THE rôle of heredity in the causation of mental defect has long been a fertile source of controversy. During the last few years two aspects of the problem have especially been discussed: (1) How is mental defect transmitted? (2) How much mental defect is hereditary? The first question is mainly biological and has no immediate sociological importance; the second has important sociological implications.

HOW IS MENTAL DEFECT TRANSMITTED?

Fifteen years ago, when Mendelian principles were being applied wholesale to the transmission of all human infirmities, it was commonly stated that mental defect in general was the product of a single recessive Mendelian factor or gene. This view has been substantiated in respect of two rare types of amentia, amaurotic family idiocy[1] and a type of defectiveness described by Sjögren in a circumscribed area in Northern Sweden.[2] Here it was shown that 52 cases, occurring in 34 families, were all related to each other. The demonstration of consanguineous marriages in the ancestry is important in establishing that a rare abnormality is the product of a recessive gene.

But so far as the bulk of mental defect is concerned, it is now certain that this hypothesis does not hold. It does not, however, follow that, because the inheritance of an abnormality does not accord with simple Mendelian ratios of dominance, recessivity, or sex-linkage, the mode of its transmission does not conform with Mendelian principles. The fact has frequently been noted that mental defect occurs, apparently haphazard, in pedigrees wherein appear an excess of other abnormalities such as insanity, epilepsy, psychoneurosis, alcoholism, and sometimes suicide. To account for this so-called polymorphism, the doctrine of blastophthoria* or germ vitiation has been advanced. According to this, the gametes are exposed to damage from toxins or other noxious agencies which, while not impairing their viability, are capable of producing "polymorphic" abnormalities in later generations. This view derived much support from the papers of Stockard[3] according to which the descendants of alcoholised guinea-pigs exhibited weakness and deformities up till the fourth generation as compared with control litters. His experiments were, however, repeated later by Durham and Woods[4] with entirely negative results. But Stockard's findings provided propagandist ammunition themselves indicated the difficulty of choosing the ideal scheme. Several important points were nevertheless brought out in the discussion.[1] In the first place none of the speakers was satisfied to rely solely on the time-honoured mercury in the treatment of congenital syphilis. It was agreed that although the symptoms may clear up quite readily under its influence, the improvement is often followed by relapse, both clinical and serological. Of single drugs the best on the whole are arsenobenzol derivatives which may be given either intravenously or intramuscularly. Very good results can be got with these, but their effect is quicker and more lasting if they are used in conjunction with (or alternating with) bismuth, preferably in the form of bismuth oxychloride. This combination has proved very efficacious and toxic effects are rare in infants and children. Dr. NABARRO also mentioned cases treated with arsenic by mouth in the form of Orasan or Stovarsol, and was able to report good results, although not yet prepared to describe them as cures. Should this method prove adequate there is no doubt that in many centres it will soon replace treatment by injection, as it seems to have done already in some continental clinics. The main disadvantage is that this remedy, like mercury inunctions, is administered by the parent and may not reach its destination in exactly the quantities prescribed; whereas injection of drugs at a clinic ensures that they will do so.

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[1] von Torsten Sjögren: Hereditas, 1930–31, xiv., 3.

[2] Idem: Acta psychiat. et neurolog., Suppl. II., 1932.

* The term blastophthoria was first used by Forel, and is in many respects unsatisfactory. The word *βλαστός* means a shoot or sucker; also a child. It therefore suggests a somatic structure rather than a germ cell, and this implication is borne out by its use in such words as blastoderm and erythroblast. The word *φθορά* means corruption or mischief. The word blastophthoria therefore implies an agency which damages the fœtus rather than the germ cell. The word has suffered from being written by many psychiatrists as "blastophoria." To leave out the "th" is a solecism equivalent to omitting it in such words as diphtheria or ophthalmology, and indeed entirely changes the meaning of the word. The word phoria, as in euphoria, is derived from φέρω, I bear, and the word blastophoria, as commonly used, should therefore mean the process of carrying something embryonic, as does the pregnant uterus. Psychiatry would suffer no harm if the word were dropped altogether.

[3] Stockard, C. R.: Am. Nat., 1916, xlvii., 641.

[4] Durham, F. M., and Woods, H. M.: Med. Res. Coun., Special Report No. 168, 1932.

The question how much treatment is necessary for cure is still in debate. Dr. NABARRO is prepared to give the minimum necessary to render the patient free from symptoms and serologically negative, provided he is certain of being able to keep the case under observation several times a year, at least until puberty. If this is not possible it is advisable, he thinks, to continue treatment vigorously for at least two years, irrespective of the clinical condition. It was also pointed out in the discussion that it is wise to be guided by a precipitation reaction of the blood, such as the Kahn, rather than by the Wassermann reaction, which usually becomes negative first. A routine examination of the cerebro-spinal fluid is highly desirable in all cases, whether they exhibit nervous symptoms or not. Those with a positive C.S.F. reaction should be treated with Tryparsamide intravenously and bismuth intramuscularly, and if this is done only the more severe ones will require malariotherapy. The late Dr. DAVID LEES reported excellent results with this routine, and also favourable results in about 30 per cent. of juvenile general paralysis cases treated with malaria.

Finally it cannot be pointed out too often that the ideal approach to the problems of congenital syphilis is by way of prevention—by detecting the syphilitic mothers and treating them adequately during each pregnancy. By this means it can be made almost certain that the child will be free from the disease at birth; or if not entirely free that it will be so little affected as to be curable in a very short time.

PITUITARY EXTRACT AND BLOOD PRESSURE

OLIVER and SCHÄFER in 1895 reported that the blood pressure of anæsthetised animals rises on injection of extracts of the pituitary gland, and later it was shown that this effect is due to an active principle which is obtainable from the posterior portion or pars nervosa though formed, it is said, in the pars intermedia. The effect of this principle on the blood pressure has now been investigated, both in man and animals, by many workers. In man it seems to have no constant influence, some observers reporting a rise of pressure, and others a fall, after subcutaneous or intravenous injections. The conflict of evidence, however, does not seem to be reflected in any general doubt about its clinical efficacy. As W. M. MOFFATT[1] points out, the statement appears in the latest edition of "New and Non-official Remedies" that the "intravenous or subcutaneous injections of preparations of the posterior lobe are followed by an increase of blood pressure which is maintained over a considerable period"; and manufacturers of these preparations often recommend their use in cases of hypotension and shock with the object of raising the pressure. Similarly they suggest that the drug should be withheld where hypertension is already present.

In his own experience, MOFFATT finds no ground for supposing that pituitary extract ever causes blood pressure to remain at a high level for a "considerable" period. In the investigation described in his paper he gave intramuscular injections of 1 c.cm. of obstetrical pituitrin to 62 persons ranging in age from 8 to 56 years, with initial systolic pressures varying between 82 and 218 mm. Hg and diastolic pressures of 58 to 110. They were observed at frequent intervals for an hour after the injection, and no constant alterations in the blood pressure were found. In many patients there was little or no change; in a few there were conspicuous changes in pressure, but more often a fall than a rise. Over the hour of observation the general trend of the pressure, after an initial temporary rise, was downward. This downward trend was characterised by a fall of the systolic rather than of the diastolic pressure, and consequently a slight constant decrease of the pulse pressure was observed. In general it was found that the higher the initial systolic pressure the greater was the fall following the injection of pituitrin, which suggests that the drug is not necessarily contra-indicated in cases of hypertension. In this connexion MOFFATT raises the question whether in his cases arteriosclerotic changes were more extensive in the peripheral than in the coronary vessels. If so, the constriction produced by pituitrin would be greater in the coronary than in the peripheral vessels, and he propounds this as a possible explanation of the greater fall of pressure in hypertensive cases.

Using the preparation known as infundin, B. SACKS,[2] in 1924, found that a small but distinct elevation of the arterial pressure was the rule, the maximum occurring about one minute after intravenous and three minutes after subcutaneous injection. In none of his cases was there a fall of pressure that could be attributed to a direct action of the drug, and during the hour of observation after injection no fall of pressure took place. Contrary to what was noted in MOFFATT's cases there was more often a change in the diastolic pressure than in the systolic; but in both series the pulse pressure—the difference between systolic and diastolic—was reduced. The contradictions of the two sets of observations perhaps may be explained by the fact that MOFFATT used pituitrin and SACKS infundin, both of which are posterior lobe extracts but prepared by different manufacturers. Variation in the effects of injection, both in man and animals, is only to be expected until the hormone has been isolated in its pure form, and in the preparations now available there are probably small quantities of other active principles which have some effect on the blood pressure. It is also of some practical importance to note the possibility that anæsthetics modify the action of the drug. C. M. GRUBER[3] in 1929 found that vasopressin and pitressin caused a rise of pressure in dogs anæsthetised with chloral but a fall in those which had no anæsthetic. A series of subsequent papers[4] from McGill University tends to confirm this observation—in so far at least as they show that "a fall of blood pressure is the predominating effect of the intravenous injection of pituitary extract in the normal unanæsthetised dog."

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[1] Brit. Jour. Vener. Dis., 1934, x., 1.

[1] Amer. Jour. Med. Sci., 1933, clxxxvi., 854.
[2] Heart, 1924, xi., 353.

The experiments so far described deal with the action of posterior pituitary hormone when injected intravenously or subcutaneously, but there is already reason to believe that physiologically posterior pituitary hormone is secreted into the cerebro-spinal fluid. This is important, for HARVEY CUSHING has shown (1931) that the hormone, when injected into the ventricle, produces effects which differ from the effects of subcutaneous injection. Recently H. HELLER[5] has produced convincing evidence that when pituitary hormone is injected into the cisterna magna of unanæsthetised dogs there is a marked increase in blood pressure which he has shown to be of central and not of peripheral origin. It may well be that physiologically pituitrin influences blood pressure mainly by its action upon the vasomotor centres, and that the changes in blood pressure after subcutaneous injection are of pharmacological rather than of physiological interest.

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[3] Jour. Pharm. and Exp. Therap., 1929, xxxvi., 155.

[4] Ibid., 1930, xxxviii., 461 and 473; 1931, xlii., 455; 1933, xlvii., 355.

[5] Klin. Woch., Feb. 17th, 1934.

ANNOTATIONS

SPA TREATMENT

THE accounts in the medical and especially the daily press of the recent conference at Harrogate have been of a character that should be very encouraging to the British Health Resorts Association, a body which has not received the attention from the medical profession which it merits. Speaking at the dinner given by the Harrogate Medical Society to delegates from the Association who were attending the conference, Lord Meston, the president, made an important point when he said that the receipt by British spas of State subsidies was not being sought. Many, if not most, continental spas receive such assistance, and having regard to the large sums of money that are expended at these centres by foreign visitors no doubt the policy can be justified; but in this country medicine is more shy of receiving money from any source where other than therapeutic grounds might influence the allocations. Municipal and medical endeavour at each locality, it is held, is often likely to result in scientific treatment; but more than one speaker at the Harrogate conference, as at previous conferences, indicated ways in which local interests might be at variance with regimented treatment. The British patient on his home soil is not taken over, as it were, by his medical advisers and subjected to the course of beneficent dictation, especially with regard to diet, to which he has to submit in many places abroad; and while this suits the national temperament, and no harm should result where the patient is obedient and self-controlled, there is always a risk lest opportunities provided by residential hotels or lodging-houses should tempt the more pliable invalid to treat the therapeutic spa too much as a focus of diversion. The blame here is often laid upon the wrong shoulders, for it is the medical men who have dwelt with such insistence upon the benefits to the sick not only of change of air and environment but also of amusement. The remedy lies in the hands of the doctors, and several speakers at the Harrogate conference pointed to the direction which it should take. There should be close coöperation between the municipal officers and hotel managers and the doctors, all concerned combining to regulate the patient's life exactly in accordance with the attempts to cure or to relieve his condition. This will become easier as British spas develop the intent to specialise in their objects, and to become centres for the treatment of the particular cases found to be most amenable to the natural resources of the health centre. Colonel W. Byam, chairman of the medical advisory committee of the B.H.R.A., described as one of the first duties of the Association the diffusion of information obtained from local conferences, and that procedure will become more valuable as the information grows more precise. What many members of the medical profession want to know are the reasons for believing that patients of a certain class will be well advised to resort to spas possessing certain resources.

THE FILTERING CAPACITY OF LYMPHATIC GLANDS

FILTRATION by lymphatic glands has long been a commonplace of medicine. Investigations on the lymphatic system made by Prof. Cecil K. Drinker and his colleagues during the last three years at Harvard University have made clearer its mode of action and its marked efficiency. As to the former, Drinker, with George B. Wislocki and Madeleine E. Field,[1] showed that when, by the technique which they have perfected, a lymphatic gland of a heparinised dog anæsthetised with nembutal is perfused through its afferent lymph vessel with dilute Indian ink, the retention in it of these microscopic particles is almost complete. Section of the gland shows that the walls of the marginal or cortical and of the intermediary sinuses, and the reticular fibres which cross and recross them, are studded with these minute particles. Some of Dr. Drinker's sections displayed at a meeting of the Royal Society of Tropical Medicine and Hygiene last November showed in striking manner the effects of this spider's web quality. The efficiency of this filtering capacity has since been measured in a number of animals by Drinker, Field, and Hugh K. Ward,[2] using either red corpuscles or hæmolytic streptococci. Their technique is such that they can isolate the afferent and the efferent lymphatic of the popliteal gland of a dog without interfering with its blood-supply, and run through it a measured quantity of an even and standardised suspension of the test fluid at a pressure which their earlier work has shown to be within normal limits, that is to say, those which obtain under passive movements of the limb. From their numerous experiments they have reached the opinion that lymph entering a gland passes as readily through the intermediary sinuses as it does round the marginal sinus; in other words, much of the lymph which reaches the efferent vessel has passed through the gland, and has not merely skirted it by way of the marginal sinus as M. Nordmann has suggested it does. Measured numerically, by counts of red corpuscles or of the streptococcal colonies grown by plating the fluids of the afferent and efferent lymphatic vessels, it appears that when the pressure of entering lymph was less than 30 mm. of mercury, only one corpuscle in 200 escaped through the gland, while no colonies appeared in the efferent fluid even when the entering fluid contained 30 million streptococci per c.mm. Their results show how excellent a filtration arrangement, even before biological reaction begins, is this relatively huge sinus space with its wide and irregular paths and its multitude of baffles. But the perfection of that mechanism depends largely upon persistent quiet and rest, for even very gentle massage of a gland which is perfused with red corpuscles results in the appearance of large numbers of these in the effluent. Here then is experimental proof of the essential need to insist on immobility from the beginning of septic inflammatory conditions. The writers add that their facilities have not permitted them to test the filtration of microfilariæ, but that their results with red corpuscles suggest that the much larger microfilariæ would have great difficulty in passage; accordingly they hope that their paper will induce workers within the tropics to test this point. That should certainly be undertaken without delay. Nevertheless it will be disappointing and a marked loss to medicine if the operative skill and experimental experience available in the Harvard laboratory cannot obtain the means to try out a point so important in the pathology of Bancroftian filariasis.

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[1] Anat. Record, 1933, lvi., 261.

EFFECT OF METALS ON BONY REPAIR

SURGEONS with some experience of fractures are aware that plating of the fragments may result in defective repair. Occasionally there is complete failure of union with formation of a false joint; more frequently there is simple delay; often there are signs of a rarefactive process, the screws become loose, the fragments become displaced, and the advantage of accurate apposition is lost. These effects happen when there has been no discernible fault in operative technique and no infection. A number of experiments on animals to study the effect of metals on the growths of new bone have been made, but nearly all these have been unsatisfactory because they have been performed under conditions with too many uncontrolled factors. In a recent publication G. Menegaux, P. Moyse, and D. Odiette report[1] their experiments to elucidate this problem. Maintaining that it is a purely cellular problem, they have tested the influence of different metals on the growth of fibroblasts and osteoblasts in vitro. All the experiments were made upon chicken tissue grown in plasma by the ordinary routine methods of the laboratory. Taking precautions to make the conditions of the experiment as uniform as possible, they found they could classify metals into three groups: those that seriously interfered with growths of cells, those that had a slightly inhibitory effect, and those that had apparently no influence upon the growth and life of the cells. It is of great importance to note that the metals grouped as very toxic are just those which are commonly employed in bone surgery—namely, soft steel, iron, and aluminium bronze. These metals produce great inhibition of growth of cells in artificial culture. Of medium toxicity may be mentioned nickel and certain aluminium alloys. Non-toxic metals were found to be gold, aluminium, lead, and some of the new stainless steels. There may be, and are, objections to transferring the results of experiments under such artificial conditions to those in the living body; yet the test was a severe one, for the life of cells in culture where the products of metabolism remain to exert their harmful effects is more precarious than those whose circulation is intact, and more likely to be injured by metals than the cells under the more favourable conditions of life in the body. These researches certainly seem to indicate the advantages of stainless steel, which many surgeons have come to realise from experience, especially in the treatment of fractures in the neck of the femur. Nails were shown by Delbet and others to delay or prevent union. The success of the stainless steel Smith-Petersen type of peg may be due largely to the material of which it is made.

THE TRAINING OF PUBLIC HEALTH NURSES

IT is estimated that there are at present some 20,000 public health nurses employed in the United States by approximately 5000 organisations. Roughly one-third of these nurses work for "voluntary" organisations—i.e., they are not under governmental administration. The other two-thirds are under the direction either of official educational authority or under departments of public health. In 1912, when there were some 3000 public health nurses already in the field, a professional organisation, the National Organisation of Public Health Nursing, came into existence. Since then this central group has been engaged in coördinating experience, formulating standards and criteria of performance, and in general working for improvement both in the opportunities to be sought and the ability to make use of them. In 1931, aided by a grant from the Commonwealth Fund, the organisation undertook a survey of a cross-section of the public health nursing profession. The results of this survey have just been published.[2] The survey was made in 28 communities, rural and urban, in all sections of the country. The distribution of the public health nursing service was found to be very uneven, having little or no relationship either to need or to potential capacity to pay for nurses. The most common ratio of service was one nurse per 3000 to 4000 population, but the surveyors do not consider this an ideal index since it is too inflexible and is based upon actual rather than planned conditions. An interesting recommendation is that official services should be supported by "advisory committees" composed of laymen and laywomen who are interested in the work of the nurse. They are to interpret to her the anxieties and the needs of which the community is conscious; while she explains to them the needs which are apparent to her and the means by which they may be satisfied. In this way false economy in the curtailment of essential health service can be to some extent prevented. In the opinion of Dr. Livingston Farrand, who writes a foreword to the report, its most important feature is the evidence supplied of the great immediate need for improvement in the preparation of the public health nursing personnel. The defects of the present system of training are said to be specially noticeable in the inadequacy of public health nursing service among school-children. It is shown that most nurses have little or no contact during their professional training with healthy children after the period of infancy; and they come to public health nursing with relatively little knowledge or understanding of the health problems of the children of this age-group. The nurse should therefore have post-graduate training in public health and properly supervised experience in those duties of a public health nurse which are not a part of an ordinary hospital training. It is not only in the United States that an impression is growing that the preparation of the public health nurse for her important duties is inadequate, and the qualifications suggested by the National Organisation of Public Health Nurses for future candidates for this service have more than local interest.

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[2] Jour. of Exper. Med., 1934, lix., 393.

[1] Presse Méd., April 21st, p. 658.

[2] Survey of Public Health Nursing Administration and Practice by the National Organisation for Public Health Nursing. Katharine Tucker, general director, and Hortense Hilbert, assistant director for the survey. New York: The Commonwealth Fund. London: Humphrey Milford, Oxford University Press. 1934. Pp. 262. 8s. 6d.

THE INCIDENCE OF DIABETES

In a further study[1] of diabetes mellitus by Elliott P. Joslin, Louis Dublin, and Herbert Marks, the magnitude of the problems involved is indicated by means of calculations of the probability of dying from this disease and of the number of cases existing at the present time. On the basis of the death-rates experienced in the United States in 1930 it is found that 15 white males per 1000 born and 27 females per 1000 will eventually die from diabetes. In both sexes the probabilities based upon these 1930 death-rates are at every age appreciably higher than those given by the death-rates of 1920—in fact for females the increase is of the order of 50 per cent. at each age. For both sexes the risk increases slowly to a maximum at 50–55 years, shortly after which other causes exact a greater toll and a rapid decline in the diabetes risk is apparent till the end of life. With such death-rates, over two and a half million persons, or 2·08 per cent. of the population living in the United States in 1930, may be expected to succumb to diabetes—i.e., if the current mortality experience continues to prevail. The present incidence in the United States is estimated to lie between 300 and 400 thousand cases at any one time. A closer scrutiny of the mortality experience suggests that the disease is more prevalent and is increasing faster in urban areas than in rural areas. Racial differences can be only roughly assessed, but using material from New York State and Pennsylvania it was found that the Teutonic peoples suffered more frequently than the Latins, while statistics confirm the clinical observations of an excessive frequency amongst Jews. The Irish, who in Ireland have a low death-rate, show a relatively high rate in the United States, a paradox which the authors attribute to two factors—the higher level of prosperity among the Irish in the States and the disproportionate number engaged in the liquor trade. The occupational mortality statistics of England and Wales have revealed the abnormally high diabetes mortality of persons engaged in this trade (inn-, hotel-keepers, publicans), their rate in 1921–23 being nearly three times that of all occupied and retired males and the highest recorded for any large occupational group. Taken as a whole, the Registrar-General has shown, diabetes mortality varies directly with social status, decreasing with each successive broad grade of social standing. Rates below average are found both in this country and in the United States amongst farm workers and miners, and the incidence appears to be generally low in persons engaged in occupations requiring hard manual labour.

It is well known that the war period 1914–18 was marked by considerable declines in diabetes mortality. This improvement was not confined to the belligerent countries but was, at least to some extent, apparent amongst neutral populations. With the diversion of physicians into military service less complete diagnosis may have played some part in this fall, but it seems likely that restricted food-supply was an important factor. On the other hand, no decline in mortality has accompanied the severe world-wide depression, but as Joslin, Dublin, and Marks point out, the effects of economic crises are not clear-cut. The prices of foodstuffs may drop as rapidly as the rest and the fall in the consumption of food may not be large. The consumption of sugar, judging by the statistics quoted for various countries, does not in itself appear to be an important factor in the diabetes rate or an explanation of the rising mortality. This paper forms a useful review of some of the statistical aspects of diabetes incidence and mortality throughout the world. In their next paper the authors propose to discuss the way in which they believe the external forces influencing diabetes must operate.

COLLAPSE THERAPY IN PNEUMONIA

Some time ago Dr. J. J. Coghlan gave an account[1] of a series of cases of lobar pneumonia treated at St. Olave's Hospital, Rotherhithe, by artificial pneumothorax. He suggested that the separation of the inflamed pleural surfaces relieved pain and facilitated respiration, while the partial collapse limited the flow of blood through the lung. In his hands the induction gave rise to something very like a normal crisis; profuse perspiration set in almost as the needle was withdrawn, cyanosis and dyspnœa were relieved in 15–30 minutes, defervescence occurred in two or three hours, and the appearance of acute distress was lost. It was found, however, that control of the pneumonic process was only temporary. Of the six cases reported, three were young adult males of whom two recovered, while the third had some recrudescence of old tuberculosis in the opposite lung. A fourth case was relinquished for reasons apart from the pneumonia. The fifth was that of a child of 9, so ill on admission that she was not expected to live through the night, who recovered. The sixth was an elderly male with myocardial failure, who was given an exceptionally large fill of 750 c.cm. as a last resort and who died, probably in spite of treatment. Coghlan's experience was novel in this country, although there were continental records of 27 cases so treated by clinicians since 1921, and his work led to some further tests in China and Mexico, a total of 50 cases in all. Dr. L. M. Lieberman and Prof. S. S. Leopold, of Philadelphia, summarise[2] all the results. The ages ranged from 6 weeks to 62 years. In 41 the pneumothorax was instituted between the second and tenth days; in the remainder so late as to be regarded as treatment for complications, rather than for the attack itself. The number of fills averaged two, the amount of air injected at a time 400 c.cm. for adults. In the entire group 47 patients recovered and 3 died. "Despite these almost incredible reports in the literature" (to use their own words), Lieberman and Leopold were unwilling to treat patients themselves without first studying the problem in animals. Accordingly they injected 36 dogs with virulent pneumococcal strains, types I. and II., into the lower-lobe bronchi by means of the bronchoscope. Half the animals were treated by artificial pneumothorax, half reserved as controls. Observations on the course of the disease included clinical study, daily leucocyte determinations, blood cultures, and X rays. No other treatment was employed. In the untreated group 5 recovered, whilst in the 13 others the disease progressed to a fatal termination; in the pneumothorax group there were 15 recoveries and 3 deaths. These experimental results confirm the clinical evidence that collapse therapy produces a picture, temporarily at least, comparable to the crisis in lobar pneumonia. In the experimental animal there seemed also to be a favourable effect on the blood-stream invasion. The Philadelphia observers do not offer any explanation for the modus operandi of this method of treatment. They do not recommend it as a routine treatment of pneumonia, but believe it may have a place in the treatment of selected cases of unilateral pneumococcal lobar pneumonia if due regard be had for the danger of circulatory depression. They agree with Coghlan that lobar pneumonia is emphatically not the disease in which to acquire experience in the technique of artificial pneumothorax.

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[1] Amer. Jour. Med. Sci., April, 1934, p. 433. Their previous study was noticed in these columns on Jan. 20th, p. 141.

[1] The Lancet, 1932, i., 13.

HEALTH IN ICELAND

An official report[3] of public health in Iceland in 1932 reflects the problems of a highly civilised but very isolated community, a third of whose population of 111,000 is centred in a single town, Reykjavik. But though isolated, Iceland has been involved in the economic world depression, farming in particular having been hard hit by the constantly falling prices of farm products. With unemployment affecting a large proportion of the population, and its economic status at a low ebb, it is remarkable that in the year under review the general health conditions were above the average. Only once before (in 1928) has the general death-rate been so low, and only in two earlier years was the infant mortality lower. Among the causes of death, tuberculosis heads the list as usual (220 deaths). "Old age" comes next with 166, malignant disease with 139, pneumonia with 107, heart disease with 104, apoplexy with 78, accidents with 53, premature birth and debility of the new-born with 27, scarlatina with 17, and nephritis also with 17. Other and unknown causes accounted for 263 deaths. The inclusion of scarlet fever among the ten most frequent causes of death draws attention to the part it has played since it became endemic in Iceland at the beginning of this century. Since then it has reappeared in waves, and has sometimes seemed to be on the point of extinction. The last wave began about the middle of 1930 and has not, apparently, culminated yet. An epidemic of poliomyelitis, with 81 cases and 15 deaths, was the most serious since that of 1924. Cerebro-spinal fever was diagnosed bacteriologically for the first time in 1932, the patient being a child in Reykjavik. Prophylactic measures were at once adopted, and the disease did not spread, but its origin remained obscure. The venereal diseases seem to be on the increase, for the notifications of gonorrhœa have risen from 259 in 1923 to 372 in 1932, and those of syphilis in the same period from 22 to 50. Hitherto syphilis could hardly be regarded as endemic, the vast majority of cases arising abroad; but during the early part of 1932 it assumed the proportions of a modest epidemic in Reykjavik, checked by the end of the year. The responsibility of tuberculosis for nearly one-fifth of all the deaths should be linked with the observation that it often runs a rapid course, with meningitis as the immediate cause of 20 per cent. of the deaths. According to Table IX., 1847 school-children in 14 medical districts have been subjected to the Pirquet test whose proportion of positive reactions ranged from 11·1 to 52·5 per cent., with an average of 33·1 per cent. Tuberculosis in cattle is practically unknown in Iceland. Some years ago a campaign was instituted against favus, the Government paying for the treatment of patients at the Rontgen Institute in Reykjavik. The results have been so good that only one case is now known to exist in the whole of Iceland. Both leprosy and hydatid disease are on the wane, the number of cases of the former having declined from 56 in 1923 to 27 in 1932. The notification of cancer is still very defective; in 1923 there were 95 deaths notified as due to cancer, and in 1932 there were 133 notified deaths from cancer and ten from other malignant disease. Until the last few years, doctors seldom induced abortion. Now increasing pressure is being put on them to do so, and on p. 64 of the report an analysis is attempted of the indications for the curettings and artificial abortions undertaken in as many as 91 cases in hospital. Breast-feeding is the rule from which there are comparatively few lapses. Vaccination is compulsory. What was, perhaps, the most notable feature of public health in Iceland in 1932 was legislation affecting the relations between doctors and patients, and the activities of quacks which are now absolutely forbidden.

SYMPATHECTOMY FOR DYSMENORRHŒA

Since Cotte, of Lyons, introduced in 1925 the operation of presacral neurectomy for intractable dysmenorrhœa and other forms of severe pelvic pain, his procedure, attractive in its simplicity, has almost superseded the older operations upon the sympathetic nerve-supply to the pelvis. Three recent papers testify afresh to its value. J. Soler Julia[1] reports 37 cases of dysmenorrhœa treated in this way. In 17 sympathectomy alone was done, with complete relief in 14, improvement in 1, and failure in 2. Of the remaining 20 patients, 18 also had an appendicectomy or correction of retroversion or both; in 2 peri-arterial sympathectomy of the ovarian arteries was done as well as the presacral neurectomy. Sixteen were cured, 2 were relieved, and in 2 there was no improvement. Julia suggests that in the cases not relieved the whole of the sympathetic supply was not removed, and points out how little is known of the exact paths followed by the sympathetic fibres to the pelvic organs. A. W. Adson and J. C. Masson,[2] whose paper contains a useful summary of the anatomy of the pelvic sympathetic, are also convinced of the value of Cotte's operation for cases of dysmenorrhœa in which the gynæcological lesions found seem to be insufficient to account for the trouble. In the 6 cases they report the results were very encouraging. J. L. De Courcy[3] lays stress upon the need for careful selection of cases, since in hysterical patients no operation is of much value, while if organic lesions are present treatment of these must precede or accompany presacral neurectomy. This author makes it a routine practice to dilate the cervix before proceeding to open the abdomen, and he reports on 21 patients, none of whom failed to get relief. These observations make it evident that presacral neurectomy holds out a good hope of cure in severe cases of functional dysmenorrhœa in which other methods of treatment have failed.

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[2] Amer. Jour. Med. Sci., March, 1934, p. 315.

[3] Heilbrigdisskyrslur. Public Health in Iceland (English Summary), pp. 152.

[1] Rev. méd. de Barcelona, March, 1934, p. 235.

ARTIFICIAL PYREXIA

THE brief survey given in our last issue (p. 1075) of the control of body temperature suggests some remarks on artificial fever. Here a distinction must be drawn between the individual as an entity and the cells of which he is composed. Both are heated and the net result of a rise in temperature must involve many processes. At least three factors may be partially disentangled. First, the natural response of the body is overborne; reflex dilatation of the cutaneous blood-vessels and profuse sweating occur, while presumably the muscles are reflexly relaxed; such attempts at increased output and diminished production of heat are unavailing. Secondly, the passive heating of the cells must increase their rate of metabolism; this is shown by the fact that the body temperature continues to rise after the preliminary heating current has been switched off. Neymann and Osborne[4] estimate that for each degree rise in temperature the basal metabolic rate averages a rise of about 7 per cent., the rise becoming more pronounced as the temperature increases.[1] The reflex reaction is thus annulled by the direct response. Thirdly, the cells of the temperature regulating centre itself must be involved, with what results it is impossible to say. Rabbits have been reported to show a disturbance of temperature control as a sequel to artificial fever. On the whole it is surprising that patients subjected to treatment aiming at generalised pyrexia suffer, according to published results, so little from after-effects; it seems that the temperature regulating mechanism is able to withstand the rough usage. Points of interest are the height to which the temperature can be pushed, and the time during which it may be allowed to remain there. There is little to be gained, however, by discussing these until observers are agreed on the fundamental significance not only of their results but also of their technique. What, for instance, is the nature of the difference between the effects of ordinary diathermy where the electrodes are applied directly to the patient's body, and those of short-wave diathermy or radiothermy where the electrodes are not in contact but the current is induced? Both methods are capable of local or general application, both produce a local or general rise of temperature, and both appear to be useful in chronic conditions and cerebro-spinal syphilis. It is claimed, however, that the short and extremely high-frequency radiothermy waves are also effective in acute conditions where ordinary diathermy is contra-indicated, and that they heat the tissues more uniformly. Their effect, as evidenced by vasodilatation, is said to last for 24 hours. As a basis for rational therapy it is essential to discover how far these and other differences are due to differences in the site (in a microscopical sense) and effectiveness of heat production, and how far to unknown effects of the short waves entirely unrelated to temperature. Claims have been advanced that the short waves have a bactericidal action, are analgesic, and have other specific effects in different diseases and on different cells according to their wave-length. These claims are supported by in-vitro experiments where, to make a sweeping statement for the sake of clarity, one particular wave-length will heat only one of a series of solutions of graded salinity; the capacity for being heated depends on the degree of electrolytic dissociation of the solute. Moreover, the disturbance of heat regulation in the rabbit, previously alluded to, is said to have been accompanied by selective destruction of ganglion cells. Most workers seem to be agreed that electromagnetic waves of less than 30 metres in length have some other effect besides that of heat production.

Until these have been worked out there are good grounds for caution in using the method, particularly for bringing about a generalised extreme rise of temperature. Tissues may differ in their resistance not only to heat, but to some other undefined physical influences. Furthermore, apart from some notable exceptions, such as the *Treponema pallidum*, it is probable that bacteria can withstand heat better than the human body, and it is therefore questionable whether the mere attainment of high temperature is in all cases the objective of choice. It would seem more profitable to explore the effects of this promising form of therapy so as to ascertain what are the specific effects, if any, of different wave-lengths, how far these are referable to stimulation of tissue resistance and hyperæmia, how far to destruction of organisms, and what is the optimum for the affected tissue and the responsible organism in the particular case. The generation of heat, the power of controlling which has up to now captured the imagination of most investigators, might then take its place as an adjunct to treatment rather than an end in itself.

PROFESSIONAL SECRECY

SOME of the problems of professional secrecy have an air of academic casuistry as though taken from a text-book. The problems can be real enough, however, as is shown by the four following cases on which doctors obtained advice from a particular source in the past year. Dr. A. attended the confinement of a girl aged 14½ years who told him that her father was the father of her child; ought he to pass on this information to the police? Dr. B. found that a maidservant's eye was in an infectious condition; ought he to tell the girl's mistress? Dr. C. attended the pregnancy of a patient who was separated from her husband; was it permissible for him to give a report to the husband's solicitors when so requested? Dr. D. found symptoms of arsenical poisoning in a patient who said she had reason to believe that her husband was poisoning her; her food and medicine were examined and arsenic was discovered; ought the doctor to set the law in motion? This group of inquiries is taken from the recently issued report of the London and Counties Medical Protection Society, and in each case the doctor was able to obtain good counsel. Dr. A. was reminded that the information was not of his own knowledge; he was advised that the child or her mother could complain to the police; he was recommended not to volunteer information though his evidence as to the confinement could be given if magisterial proceedings were taken. Dr. B. was advised not to tell the mistress but to suggest to the girl that she should herself do so. Dr. C. was warned to give no report on his patient without her consent; he could tell her of the request and, if she made no objection, he could state that he had attended her in the confinement but should give no report on the case if the patient preferred him not to do so. Dr. D. was told that the rules of professional secrecy might in the circumstances be relaxed. He was advised to get his patient, who lived alone with her husband, out of the house, and then to communicate with Scotland Yard. He did so and a prosecution followed. Such problems show the utility of membership of one of the societies for professional protection which have special experience in these matters. There have been occasions comparable to the circumstances of the second and third of these cases where a false step has involved expensive claims for substantial damages for defamation. In the case of suspected arsenic poisoning the position was different. The doctor owed no particular duty to the husband but was in much the same situation as a doctor who sees his patient's house being burglariously entered.

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[1] Jour. Amer. Med. Assoc., March 31st, 1934, p. 986.

[3] Amer. Jour. Surg., 1934, p. 409.

[4] Neymann, C. A., and Osborne, S. L.: Amer. Jour. Syph. and Neurol., January, 1934, p. 28.

THE NATIONAL PHYSICAL LABORATORY

THE report[1] of the Laboratory for 1933 contains much of medical interest. On pp. 41–55 radiologists will find new work on the production of X rays and the rating of X ray tubes. A considerable improvement has been found in the X ray output from tubes excited with a constant potential, as compared with tubes excited with a pulsating potential of the same peak voltage. This advantage is more marked with filtered radiation. Work has been continued on the photographic measurement of X ray intensities, particularly for very weak beams. For this purpose considerable improvements have been effected in X ray sensitometry. Correlative work has been done on the X ray absorption of photographic emulsions and their X ray sensitometry. Particular importance is attached to the work done on X ray and radium dosage, the röntgen (r) being now determined to an accuracy of 0·5 per cent. The Teddington laboratory, in conjunction with the standardising laboratories in U.S.A. and Germany and the Hôpital St. Antoine, Paris, is intending to submit proposals for the realisation of X ray standards, and the calibration of X ray dosimeters, to the International Congress of Radiology to be held at Zurich in July. Experiments have also been made with a new form of dosimeter. It is important to notice that the inverse square law is not exactly obeyed for X ray tubes under practical conditions. The investigation of the calibration in röntgens of the therapeutic "B-dose" has now been completed, and an account is to be published shortly. It is found that the number of röntgens per B-dose, as measured by the colour change in a barium platinocyanide pastille, is dependent on the hardness of the X rays used, the value declining to a minimum with increasing hardness and then increasing. It was found that the same results were obtained whether the pastilles were backed with 2 mm. of lead or ½ mm. of aluminium. It is gratifying to note that work has been undertaken on the influence of the wall thickness and the length on the strength of radium needles, and that valuable results have already been obtained. An account is given in the report of an X ray study of tooth structure carried out for the Medical Research Council. As a result of the work, which deals with the structure of the enamel, the different types of enamel can be divided into three classes according to the orientation of the crystals. Two of these are associated with susceptibility to caries, and the other with freedom from the tendency to decay. An invitation to visit the Laboratory on June 26th will give an opportunity to see the basis of this and much other fundamental work. Practitioners will be glad to know that the standard of clinical thermometers submitted for test continues to improve in spite of increased numbers.

INTERNATIONAL MIDWIVES UNION

ASSOCIATIONS of midwives in ten countries and individuals from five others are attending the congress of the International Midwives Union in London this coming week-end. The congress opens with a reception by the Minister of Health at Lancaster House, the discussions taking place at the Midwives' Institute, 57, Lower Belgrave-street, S.W.1. The most important of these is the discussion at 8.30 P.M. on Monday evening, at which Dr. J. S. Fairbairn will preside, when the occupants of six professorial chairs (London, Birmingham, Paris, Lille, Brussels, Budapest) will give their opinion about the best methods of training and educating midwives. Visits will be paid to many of the maternity hospitals and institutions, and the proceedings will end with a farewell dinner on Tuesday evening.

WE regret to announce the death at Belfast on Tuesday last of Mr. Andrew Fullerton, emeritus professor of surgery at Queen's University and consulting surgeon to the Royal Victoria Hospital.

AN appeal is being made, as described in our issue of May 12th, for £105,000 to build a new nurses' home and pay block at St. Mary's Hospital, London. The sum received since March 1st is more than £42,000.

THE Royal Society of Tropical Medicine and Hygiene is holding a conversazione at Manson House, 26, Portland-place, London, W., on Thursday next, May 31st. Fellows and their guests will be received from 8.30 to 9 P.M. by the president, Sir Leonard Rogers, and Lady Rogers. Application for tickets may be made to the secretary at Manson House.

A CHADWICK lecture on the national food-supply and public health will be given by Dr. John Boyd Orr, F.R.S., director of the Rowett Research Institute, Aberdeen, at 5.30 P.M. on Tuesday next at the Royal United Service Institution, Whitehall, London. At 5 P.M. on June 14th Mr. E. A. Bowles will give a lecture in the Chelsea Physic Garden on simples and herbals.

THE series of articles on Prognosis contributed by invitation will be resumed early in June, when publication of the concluding lectures on the Preventive Aspects of Medicine at King's College has been completed.

CRAIG CONVALESCENT HOME, MORECAMBE.—Last week Mr. J. B. Priestley opened the new buildings of this convalescent home for children, named after Mr. Thomas Craig, of Bradford. Since the home was first opened 11,400 children have passed through it. A fortnight's stay has added an average of 2 lb. to the weight of each child.

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[1] London: H.M. Stat. Office. Pp. 264. 13s. 6d.

THE PREVENTIVE ASPECTS OF MEDICINE

A Series of Lectures in progress at King's College Hospital Medical School

XXIII.—THE PREVENTION OF MENTAL DISORDER

It might well be thought that the province defined by the title of this lecture is large enough, but I intend to widen it by including reference to mental defect. Mental defect in the modern sense of the term, as distinguished from mental disorder, may be defined as *arrest* of mental development due to any cause, whether pre-natal or post-natal, and in the latter case operative before the age of 18.

The distinction between mental defect and mental disorder—i.e., anomaly in those who up to the age of 18 have been normal—is entirely a legal one. It is of practical use in ensuring that children with mental troubles of post-natal origin shall be treated with other children whose defect is pre-natal (rather than with adults). But the distinction is not a scientific one from the standpoint of ætiology, and for purposes of prevention as opposed to cure there is little distinction between the problems of mental defect and those of mental disorder. This is obvious in respect of certain organic conditions—e.g., mental troubles due to syphilis or epilepsy, and of gross "functional" psychoses such as schizophrenia.

It is essential to reality that one should emphasise this continuity of defect and disorder. One of our main problems is the degree in which establishment in childhood of faulty habits of reaction are dependent on innate factors and even intellectual ones; on the other hand, it is necessary to consider how far such habits are responsible for later neuroses and psychoses.

Further, I am obliged to deal both with what are termed neuroses and psychoses. Here we have a semi-popular distinction based on legal and administrative grounds. It is a distinction of some slight practical value if used only by those who appreciate its limited meaning, but may be a danger. Some years ago it would have been true to say that psychoses were such mental disorders as in the poor usually led to *treatment* in an asylum under certificate, while the neuroses were those which in the poor were usually not treated at all. Changes in law and language would now compel one to say instead that neuroses are mental syndromes of such form and degree as to be less likely to necessitate legalised treatment. But neuroses are due in varying degree to factors of the same four main groups (see below) as psychoses, and the problems of their prevention are the same. Clearly quantitative distinctions—as that in neuroses previous mental experience plays a relatively greater part in causation; that the affection of the personality is more limited; that insight is apt to be greater; and that psychological treatment of specialised kinds may sometimes be more effective—would not justify separate consideration of the neuro-psychoses and the psychoses; and they cannot even be separated for practical purposes except by contrasting extreme cases of either group.

In taking as my topic mental disorder and defect, I am therefore including all conditions in which anomalies of behaviour and of the consciousness associated with it are a prominent feature. I need hardly say that I am including organic as well as functional mental troubles, since in my view "organic" cases are merely those in which the physical basis is obvious, while "*functional*" are those in which for the present it is obscure. The distinction is one based on ignorance. The prevention of these conditions must still be propounded as a set of problems. No such record of general achievement is possible as in the case of tuberculosis. Little or no statistical evidence is available in support of the efficacy of any measures applied to the individual in preventing the onset of mental disorder.

To judge from statistics, certifiable insanity would seem as little preventable as cancer. Figures seem to indicate that the number of first admissions to institutions for certified insanity has in proportion to the population not materially decreased in the past 50 years. These patients with certified insanity are the sole cases which can be clearly identified, and therefore the only ones concerning which comparison is available.

Despite the continuity which I have stressed between the mental troubles of adult and child, between neuroses and psychoses, between organic and functional, I do not mean that all mental disorder is *one and indivisible.*

For example, there has been a considerable reduction during late years *in the certified admissions* suffering from the specific results of alcohol and syphilis. Owing to former fallacies of diagnosis, exactly comparable figures are unobtainable, but the general conclusion seems certain. But if this is so, then this reduction must be balanced by *increase in the total number* of cases due mainly to other factors. As we are dealing entirely with first certifications, the figures cannot be affected by such *points as altered* standards of fitness for discharge or changes in the institutional death-rate. Nor in London, at least, can any *explanation be based* on an increased proportion of old people. It is true that there is not only an absolute but a relative increase in the number of the old. *Among such there occur* a disproportionate number of psychoses fitting the patient for treatment in an institution, and of late, owing to improving repute of institutions, there has been a steadily increasing tendency on the part of the young to agree to the treatment in hospitals of those *mentally* enfeebled by age. But that would not affect the London figures for certified insanity because the senile mental cases are dealt with apart.

The persistence, almost unchanged, of the incidence of certified insanity is one of the worst facts of medicine.

There has been a vast *improvement* in the conditions under which patients are treated. That we possess the power to alleviate suffering is certain; but whether we can even abbreviate is very doubtful; assertions about the shortening effect of early treatment are full of statistical fallacies. The limited extent to which it is possible to prevent a first or subsequent attack will be discussed later. Any power to eradicate the constitutional tendencies *underlying the major* psychoses is still to seek. The situation is somewhat better as regards the neuroses or minor mental troubles, but the difference is far less than the enthusiasm of some optimists would lead one to believe. Mental prophylaxis is therefore an unsolved problem.

Prevention of any form of disease necessarily involves consideration of the factors giving rise to it. Briefly, in mental disorder or defect of any kind these factors may be placed in four groups:—

(1) Anomalies of innate make-up.

(2) Anomalies of the changes incidental to particular ages or epochs of life.

(3) Exceptional mental experience, whether recent or remote.

(4) Gross physical influences.

The form of every mental process must necessarily be the resultant of factors belonging to all four groups—i.e., heredity, epochs, mental experience, and physical influences. Theoretically only one factor or group might be operative, but in practice this is never so, and it is thus necessary to consider factors drawn from all the groups.

True prophylaxis perhaps should mean measures taken in advance of the occurrence of first symptoms and is theoretically distinguishable from early treatment designed to arrest progress or recurrence. If this distinction is accepted, however, there is rarely an opportunity for individual prophylaxis in the strict sense. Multiple factors are almost invariably associated in determining occurrence of psychoses and neuroses. One of these factors is commonly a long-standing, if not innate, constitutional tendency. As a rule, to eradicate this is beyond one's powers. One's usual goal is reduction of overt manifestations; in fact, the keeping of such in check, either before or after a first attack, may be all that is possible.

Having established the range of conditions to be prevented and the nature of the aim intended by the term "prevention" it is necessary to consider how this can be pursued. As always, prevention must here include *collective prophylaxis* directed towards the interests of the many and *individual prophylaxis* in any case where special risk is anticipated.

Collective Prophylaxis

The essential preliminaries of any progress in prevention of mental disorder are: (1) Education of the whole medical profession; (2) Provision of trained personnel; (3) Research; (4) Provision of suitable institutions.

MEDICAL EDUCATION

On the lack of proper education of the medical profession in regard to mental disorders depends the composure with which they as well as the public view the present incidence of insanity and mental defect.[1]

Of all children born, about 1 in 35 will at some time be certified before death. The number of those for whom at any given moment some sort of legalised special provision has to be made on account of mental disorder and defect approaches half a million. The country is spending about ten millions a year on care of those suffering from mental defect and disorder and less than ten thousand on any research to prevent these.

It is necessary for any progress towards general prophylaxis in England that the mass of the profession who are not specially concerned with mental disorder should have a greatly increased consciousness of the size of the problem and should use their influence to rouse the public. Of late years a steadily growing interest has prevailed among the leaders of the profession, but this interest is not widespread among practitioners.

The general practitioner could hardly be expected to find the time or receive the training to carry out active measures of individual prophylaxis. But he should be trained, as he is in respect of abdominal emergencies, either to recognise the cases that need specialist intervention and where to go for it, or at least where to get a sound opinion regarding the necessity of treatment. It is just as important to recognise the vast number of neurotics in whom intensive treatment is to be avoided as it is to identify those who need it.

TRAINED PERSONNEL

Psychiatrists.—As regards the medical profession, the other requisite is the provision everywhere, for consultation on behalf of the poor, of specialists for whose qualification an official body has vouched.[1]

Psychiatric social workers.—Social workers with special training for the investigation and correction of the setting in which breakdown tends to occur are indispensable to modern psychiatry. Their coöperation not only makes it possible to deal more effectively with the individual, but is also of great value in research.

RESEARCH

Organisation of research is by far the most important need of psychiatry in the near future. Special provision for its endowment was made in the Mental Treatment Act three years ago, but so far the amount spent is ridiculous in relation to the expenditure on the maintenance of even those legally recognised as suffering from mental disorder or defect.

Of late years there has appeared a definite willingness to spend money on treatment of early and minor mental disorders in out-patients and wards apart from the custody of the insane. But the main lack of all such psychiatric clinics is a treatment which is more than palliative, symptomatic, and expectant—i.e., awaiting natural recovery. Perhaps as regards treatment the situation is no worse than in respect of typhoid. As regards prevention in the full sense it is far worse.

Personally, I think that for a generation much interest has been squandered on studies having none of the qualities of science and useless for prevention because calculated at most to elucidate reasons for the form rather than for the occurrence of mental disorder and defect.

SUITABLE INSTITUTIONS

Where should a programme of education, research, and preventive psychiatry be carried out? My view is that in Great Britain, as in all progressive countries of the world, the university psychiatric clinic should be their nucleus. Such clinics should provide for the treatment on a voluntary basis of recoverable cases of mental disorder of every kind and degree. They should deal with children as well as with adults and, of course, with both in- and out-patients. As the public learns to use such clinics, their work will become increasingly preventive.

In their fully developed form as they exist in Germany, Holland, and in the more advanced States of America, such clinics form a part of every university which is attempting clinical teaching of medicine. Excellent pioneer service has, of course, been done in detached out-patient centres and at independent child guidance clinics as well as in general and neurological hospitals. But arrangements for education and research cannot be scattered and multiplied. Moreover, it is impossible to treat within the wards of a general hospital a representative collection of patients illustrating even such a range of neurosis and psychosis as the future practitioner will meet. In the absence of psychiatric clinics English students will presumably continue to be taught psychiatry mainly by a few demonstrations on the chronic insane.

There appears to be no chance that the money needed for thorough organisation of preventive psychiatry throughout the country can be obtained from voluntary sources; it will have to be found by local authorities. Provided that medical opinion has a proper weight in control there seems no disadvantage in this. University psychiatric clinics will presumably have to be municipal institutions, though in close connexion with the general hospital and the rest of the medical school. In non-university centres they should be associated with voluntary or municipal arrangements according to local conditions.

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[1] In Turkey, under the wise rule of the Ghazi, the law forbids anyone to practise as a specialist in mental disorder unless he has passed the necessary examination after two years of supervised clinical work with patients of all kinds. Perhaps some day England may emulate Turkey in this respect.

COLLECTIVE PROPHYLAXIS OF ORGANIC MENTAL DISORDERS

It is now necessary to deal with the problems of prevention in more detail. As a preliminary to the most convenient mode of discussion of them one must define a little further the meaning of the terms "organic" and "functional." By an organic case is meant merely either one in which an essential physical factor is operative (e.g., alcoholism); or in which during life or after death structural or biochemical change can be detected which is constant and characteristic and not merely the consequence of behaviour; or in which there are bodily symptoms, such as fits, which are independent results of the same process. The distinction between functional and organic, as mentioned, is one based merely on ignorance. It has, however, considerable practical value and in detailed discussion it will be better to forego a strictly ætiological order, and to isolate organic conditions before approaching the still more difficult problems of functional disorder.

In the last report of the Maudsley Hospital 33 independent organic conditions are noted as main factors in various cases among the 10,000 there tabulated. But of these 33 only 6 post-natal factors play a part in as much as 1 per cent. apiece of the total of cases. Two out of these 6 can here be ignored from the standpoint of prevention—viz., senility and epidemic encephalitis, the latter because the disease which is the source of fresh cases is now so rare. The remaining conditions are arteriosclerosis, idiopathic epilepsy, alcoholism and neurosyphilis.

Arterio-sclerosis.—The early occurrence of arteriosclerosis is a problem of general medicine and its prevention needs no special discussion here.

Epilepsy.—Collective prophylaxis of this could only take the form of eugenic measures which have hardly been attempted.

Alcoholism.—There has probably been a reduction of all morbid consequences of drinking, including those psychoses specifically due to its toxic effects, to about one-third of their pre-war frequency. In England this has been a political rather than a medical achievement, brought about by making alcohol dearer and harder to get. The triumph has been won in a contest between boost by the Trade and cost as raised by the State, rather than by precepts. The result is, of course, more satisfactory than prohibition proved in America or is likely to prove in a country with similar political organisation. It is probably less satisfactory than a scheme of State sale such as exists in Sweden and Denmark. There alcoholic addiction of such degree as to produce lasting psychotic effects has been almost restricted to those who would be unmistakable psychopaths apart from its influence, but in England the political influence of "the Trade" would presumably render State sale so unlikely to become a matter of practical politics as hardly to be worth discussion.

Syphilis.—A disproportionate reduction in general paralysis soon after the war was largely due to the death of 800,000 men mostly between the ages of 20 and 40 and naturally including a high proportion of the potential general paralytics of the next ten years. But reduction of incidence of general paralysis goes on and is probably due in the main to decrease in the number of primary infections with syphilis.

There seems some reason to believe that the decrease of primary syphilis may be in some measure connected with the reduction of the vogue of prostitution, but no reason to think that this is attributable to an increase in chastity—rather the contrary. Probably the main factors are two: increased readiness of application for treatment and early abolition of infectivity by arsenical treatment.

COLLECTIVE PROPHYLAXIS OF FUNCTIONAL MENTAL DISORDERS

It is necessary to consider prevention in relation to the main factors determining the occurrence of functional mental disorder without any reference to details of its form.

Heredity.—Exact figures concerning the probability of inheritance of this or that functional syndrome are probably fallacious. Errors may depend on the fact that groups of cases exhibiting the syndrome include a medley of conditions, as in the case of epilepsy. Conscientious selection for research of so-called unmistakable cases may isolate one subgroup in which the transmissible factor is most potent. Published observations concerning the chances of transmission may thus be true for the particular sub-group investigated. They seem too high for the clinical experience of all the cases showing the syndrome. Nevertheless, while it is impossible at present to evaluate exactly the influence of heredity in determining psychoses and neuroses, no reasonable doubt exists that this is great. The conclusion seems distasteful to the omnipotent type of psychotherapist. To the reasonable it is unobjectionable. Innate susceptibility is, of course, only one factor. Other post-natal influences are responsible in varying degree and open to prevention and treatment.

At present there seems little hope of constructive eugenics of any sort likely to influence materially the incidence of mental disorder in a wide sense.

Sterilisation.—The passage of a measure to legalise voluntary sterilisation would be an excellent gesture affirming the claim and the intention of the human race to determine to the best of its ability its own genetics as well as its own environment. Further, permissibility may be of great value in individual cases but not in collective prophylaxis. In this connexion the following points should be noted:

(1) For many reasons legislation can only properly allow voluntary sterilisation. Among other grounds is the fact that it is impossible to define conditions which are always transmissible. Such definitions would be necessary in order that a schedule of groups for the compulsory sterilisation might be tenable scientifically.

(2) Present sentiment would not tolerate eugenic sterilisation being legalised except where the abnormality likely to be transmitted is a very gross one. Any idea that sterilisation as now proposed may help to prevent neurotics and members of the so-called social problem group from breeding their kind is quite misplaced.

(3) Some safeguards are absolutely necessary in the interests of prospective applicants for sterilisation. But any tolerance of the operation will certainly be accompanied by safeguards intended to prevent conception for reasons other than those officially approved. In practice, to get sterilisation legalised at all, it will certainly be necessary to advocate the association of permission with safeguards so numerous as to render any influence on the collective incidence of mental defect and disorder almost imperceptible.

Legalisation of abortion.—For eugenic reasons, even under safeguards like those proposed in connexion with sterilisation, would probably do much more than the latter; many of those whose progeny is undesirable would be far more likely to accept operation and all the trouble connected with it on account of an actually forthcoming child than on account of purely hypothetical ones. But even legalised abortion would never make any wholesale impression on the problems of psychiatry so long as it was only tolerated for eugenic reasons under safeguards. As with sterilisation, this would necessitate its restriction to those with family history of such gross disorder as is proven by certification or similar evidence. The very continuity of minor with gross mental disorder will therefore render eugenic operations of either sort largely ineffective to prevent even these gross deviations, and totally so in respect of the minor degrees of mental defect and disorder. Yet as social problems these minor degrees are really more important than the grosser conditions.

Far more might indirectly be achieved if abortion were legalised for economic reasons. It is conceivable that the community might some day revolt against the view that those who are unable to support themselves have an unlimited title to present to the community offspring which are reasonably certain to be on balance liabilities rather than assets.

Special ages and epochs of life.—General measures to render the special biochemical aspects of any of these epochs less productive of mental disorder do not exist. It is a striking fact that practically nothing is known as to the biochemical changes which no doubt form the common foundation of the mental disorders of pregnancy. The same is true of the puerperium, of the menopause and other epochs, and therefore no general guide to prevention of these exists.

Mental Experience. (*a*) *Psychogenesis.*—In the main child guidance clinics deal *individually* with psychogenesis in the young. But there are many other agencies trying collectively to decrease the stresses which affect the potential patients of these clinics.

The prevailing tendency to emphasise the importance of the impressions of infancy would throw back the critical period to a point when not even a child guidance clinic could directly aid in prevention. This would render the education of prospective parents the sole hope. As one listens to the recitals of the early experiences alleged to produce such dire psychopathic results they seem a little banal. This is equally true whether they are considered on a Freudian or Adlerian basis. Personally I find it hard to accept as adequate such events as removal from the breast before satisfaction or from the stool while lingering over defæcation. Many of the instances of pampering or neglect or of pampering followed by neglect which are cited as explaining neuroses, psychoses and delinquency are trivialities such as have happened to many of us and are obviously insufficient without invoking another and exceptional factor to make them effective. To me it seems likely that the child while impressionable has also far more tendency towards return to the normal than such theories suggest, and that much more persistent influences are necessary to produce lasting effects. This is at least the more hopeful view, implying that the child guidance clinic has a chance to intervene while the mischief is in the making, rather than before it is done and needs such elaborate undoing as must be available for few.

While the child guidance clinic is fully justified by its effect in reducing the actual unhappiness of children, it must be remembered that there is no evidence which could possibly be called scientific as to how far such troubles as it treats are really the precursors of mental disorders in adults. It seems that a large proportion of well-defined adult psychoses, whether schizophrenic or manic-depressive, are wholly devoid of any history suggesting such relation. The connexion is apt to seem more definite in what one may call anomalies of character—including delinquency. But even here it cannot yet honestly be said to what extent any treatment in childhood can really eradicate the tendencies.

(*b*) *Sex experience and sex education.*—To me the Freudian generalisations concerning the universal and specific relation of various clinical syndromes to particular types of sex experience during early childhood seem to be based on inadequate evidence and illogical deductions. But it is possible that exceptionally such experience may so condition a child as to predispose later to the development of one of the abnormalities such as masturbation, homosexuality, or excessive erotism, which with multifarious reactions to such a tendency constitute a source of unhappiness to a good many. As to this, perhaps the first general prophylactics needed are the steady growth of a morality that is rational rather than traditional, honesty among adults, and proper education of the child. From the standpoint of the neurotic it might be a great advance if what is termed morality could be made a question of manners, and departures from it were regarded rather as crudities than as sins. Those at least who are happily married will not regard monogamy as needing enforcement by terror. There is good reason to believe that in Russia in a generation brought up entirely as agnostics and in a milieu where premarital chastity is treated as a matter of taste, the large majority of girls at least are virgins on marriage, and the greatest possible freedom of divorce leaves it still quite exceptional.

The knowledge of the frequency of masturbation in both sexes and the consequent absurdity of ascribing to it the physical and mental disorders formerly used as bogies is now widespread among doctors, but such terrors still play a large part among neurotics and psychotics of many types.

Homosexuality, though far less frequent than masturbation, is fairly common in both sexes. In a majority perhaps it depends merely upon opportunity and is transient. In others where strong attachment to a homosexual object (or other perverse tendency) is formed during the first consciousness of sex feeling, the perversion seems more likely to persist. But it may well be that such persistence only occurs where much earlier conditioning or innate disposition exists. It would be interesting to know from a standpoint of prevention the relative frequency of transient or lasting homosexuality on the one hand in co-educational and on the other in ordinary schools, but I know of no reliable statistics bearing on this question.

Individual Prophylaxis

Space forbids anything but the most cursory reference to individual prophylaxis, which can be considered under the same headings as collective prophylaxis.

MENTAL DEFECT

If, as I stated earlier, checking of progress and consequence of a primary disability can legitimately be brought under the term "prevention," then a good deal can be done in mental defect. It is apparently a proven fact that among aments whose defect is not severe enough to need an institution, those who have been brought up at special schools or under statutory supervision are far more stable in every respect. They are less prone to emotional storms, hardly ever become criminal or immoral, and are probably less prone to the supervention of an acute psychosis upon the defect. In view of all this, strict ascertainment of aments outside institutions and their suitable upbringing is essential. It is a pity that recently, with a view to "economy," the Government has directed that no more places in special schools are to be found and that ascertainment of defectives has been discouraged.

ORGANIC MENTAL DISORDERS

There is little or nothing to be said or done about averting or arresting mental symptoms in those liable to them through *old age, arterio-sclerosis,* or *epidemic encephalitis.* With regard to the last, drugs such as hyoscine, which relieve the motor symptoms, have little influence on mental sequelæ of any kind. To some extent the same is true of luminal in epilepsy. Its effect in checking motor convulsions is greater than in averting petit mal attacks or paroxysmal mental attacks. But luminal may slow the sort of deterioration which is apt to develop especially in the young when motor fits are very numerous. On the other hand the liability of heavy dosage with bromide to increase this should never be forgotten.

General paralysis.—Measures directed to reducing incidence of syphilis have been discussed under general prophylaxis. So far as I know little has been done with regard to the special problem of averting nervous sequelæ in those known to have suffered with syphilis.

Alcoholism.—Personal prophylaxis against alcoholic psychosis means early cure of addiction in those in whom it has arisen. With regard to this the position is deplorable. Personally I disbelieve entirely in all treatment outside an institution, whether psychological or by drugs, except in the very rarest instances. There are no special institutions for the poor and some at least of those catering for the self-supporting are expensive but unsatisfactory. I believe that there will never be progress without a change in the law. The modern tendency is towards treatment on a voluntary basis wherever possible, but such a method seems futile in established addictions. The provision whereby an addict could legally bind himself to remain under treatment voluntarily but for a minimum of several months seems to be falling into disuse. Considering the havoc which alcoholics play with the lives of others as well as their own the law should provide that on a second occurrence of incapacity from alcoholism requiring medical treatment commitment to an institution for a suitable period should follow regardless of certifiability.

INDIVIDUAL PROPHYLAXIS OF FUNCTIONAL MENTAL DISORDERS

Heredity.—While there is little hope that the collective prevalence of functional mental disorders in the community will be much checked by such steps as the legalisation of eugenic sterilisation or even of abortion, there is more hope for the growth of at least a family conscience that will make members of stocks in which there is concentration of neuropathic heredity more chary of reproducing their kind. There seem no reasons why they should be denied marriage, intercourse, or the permanent security that this will be infertile which they desire and which sterilisation will give.

Epochs.—Perhaps the main item worth discussion here is prevention of mental disorder arising during pregnancy, during the puerperium, or from subsequent responsibility for the child. One should include here aggravation of pre-existing disorder. Quite apart from any question of eugenic intervention on account of expected quality of offspring, there is no clear definition in law as to what justifies the production of abortion in the interest of the mother. It is perhaps inadvisable to attempt definition but the standard in practice is becoming more liberal. Perhaps this tendency will grow as the right of the law (which has given up the campaign against contraception) to force a woman who has conceived to bear a child she does not want begins to seem less axiomatic.

Mental experiences.—Personally I disbelieve in all constant psychological situations as the specific cause of particular clinical syndromes. On the contrary, I believe that every syndrome in so far as isolation is justified at all corresponds to a reaction-pattern of the organism, each of which can be impaired, released, or overactivated for a multitude of reasons, some "functional," others "organic" as above defined.

Among such reasons are all situations which in humanity can cause disturbing emotions. This disposes of the question of summary rules for the prevention of psychogenetic mental disorders. I would rather suggest some cautious general principles of a negative kind. For all prophylactic purposes psychiatry at present is grossly handicapped by lack of any indicators of susceptibility, whether innate or acquired, whether quantitative or qualitative. It is probable that linked physical characteristics might be more objective and useful, but the characteristics described by Kretschmer do not seem to meet requirements. In the absence of such indicators, great caution is necessary to avoid doing individuals and the community the worst possible disservice by prophylactic enthusiasm.

It is neither possible nor desirable that the community should adapt its requirements and its rewards to the weaknesses of the neurotic. The quest of safety for the neurotic almost inevitably means renunciations, and these renunciations may themselves eventually bring stresses at least as great as those they were meant to avert.

That the danger of fostering neurosis by attempts to prevent it or cure it is a reality is shown, for example, by many cases of war pensioners. I entirely agree with the conclusion reached by Dr. S. A. Kinnier Wilson in an earlier lecture in this series, as to the inadvisability of encouraging neurotics to discuss their symptoms and their causation. For a very large number of neurotics, stoicism is still the best course to recommend.

Much of the talk about encouraging seeking of medical advice upon the first appearance of symptoms is wholly wrong in the case of neuroses, whatever may be true in case of symptoms suggesting possible cancer or tuberculosis. If one could be sure that in a large majority of cases patients would be dismissed with reassurance and encouragement, one would be much more easy about the ultimate result of the multiplication of centres for psychiatric advice. As to the giving of collective counsel upon details of mental hygiene directly to the public by lectures and pamphlets (as opposed to urging resort to expert advice), in view of all the possibilities of misunderstanding and misapplication, it seems to me likely that on the whole this will do more harm than good.

EDWARD MAPOTHER, M.D., F.R.C.P. Lond.,
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ST. BARTHOLOMEW'S HOSPITAL.—The report of the treasurer, Lord Stanmore, shows that in 1933 the number of new in-patients was 10,333, a reduction of 476, whose average stay was 21·4 days. At £225,000 there was a net decrease in income of £243; on the other hand, the expenditure—£194,000—fell by a fraction over £3000. By arranging for old and new cases and male and female patients to attend at different times much unnecessary waiting has been saved to out-patients, who numbered 90,311. Some remarkable figures are contained in the pharmacist's report. In 1913 there were consumed (fractions omitted) 235 gallons of brandy; in 1933 the quantity was 11. Port fell from 216 to 4 gallons; whisky from 1¾ gallons to nil; burgundy from 9¼ to less than 1¾; and quarter-bottles of champagne from 155 to 17. Particulars are given of the sale of a small farm in Kent which had produced a net annual income of £5; the invested purchase money yields over £32. In the year ended with July, 1933, there were 964 students attending the medical college. The nursing staff now numbers 404, and of 91 entrants for the first year examination of probationers 84 passed. The Charity Commissioners have sanctioned the expenditure of a sum not exceeding £150,000 for the erection of the new medical block, subject to the replacement of the money in 60 years by means of a sinking fund.

SPECIAL ARTICLES

MUNICIPAL HOSPITALS

In opening a discussion, at the annual meeting on May 13th of the Socialist Medical Association, on the

Present Scope and Future Development of Municipal Hospitals

the president, Mr. Somerville Hastings, said he wondered how many of the Members of Parliament who voted in favour of the Local Government Act, 1929, really appreciated what they were doing. Rightly used it was the key which would open the door to a complete and unified municipal hospital system. The Act, although full of uncertainties and anomalies, did transfer the powers under the poor-law from small local boards of guardians to county councils with an instruction to them to sit down and think out how best to utilise their new powers. As far as the development of hospitals is concerned, no increased powers were given. Section 131 of the Public Health Act, 1875, stated that " any authority may provide for the use of the inhabitants of their district hospitals or temporary places for the reception of the sick," and the only later addition was the inclusion of pregnant women amongst the sick. It seemed curious that until quite recently hardly any use has been made of these powers, with the exception of Widnes and Barry, which provided themselves with accident hospitals, and Bradford, which took over a poor-law infirmary and administered it as a general hospital.

Local authorities had now been set thinking in one of three directions :—

(1) Many authorities had left their hospitals as poor-law infirmaries much as they found them, so that anyone who took advantage of treatment there became technically a pauper. The normal means of securing admission was to apply to the relieving officer for an order, but the medical superintendent could in an emergency admit any patient on his own responsibility.

(2) A few authorities had made a declaration that any assistance provided should be by virtue of the Public Health Act, 1875.

(3) A much larger number of authorities (including London) had appropriated the hospitals and were running them as municipal hospitals under the 1875 Act. The term " appropriation " may need a little explanation. By means of this power a council can take over property or land and use it for any agreed purpose—e.g., providing hospital treatment according to the powers permitted by the Public Health Act 1875.

Before making a declaration (2) the authority had to be certain of sufficient accommodation and facilities ; for once a declaration were made, it would be illegal to treat any sick person in a poor-law institution. If appropriation (3) were decided upon, the commitments were less serious and the advantages still very considerable. In the first place, admissions, except in the case of the destitute, were made by the medical superintendent, the usual method being for the patient's doctor to ring up or write to him explaining the case. It was, he thought, a disaster that under the Act the cost of maintenance and treatment for any disease other than infectious had to be recovered from patients who could afford to pay for it. If the hospital was appropriated, consultation with the Ministry of Health over details of administration was not required, and the authorities had much greater freedom.

In whichever way severance from the poor-law was accomplished it opened enormous possibilities of development, especially in urban areas where the population was considerable and the hospitals not too far apart. Specialisation became possible ; certain wards in one hospital could be set aside for the treatment of cancer by radium and X rays, in another hospital for eye cases ; facilities could be provided for thoracic surgery or bronchoscopic work in a third, and so on. It became an easy matter to transfer patients from one hospital to another or to obtain the services of any type of specialist needed. If a severe epidemic broke out and the isolation hospitals were filled a block of wards, or even an entire general hospital, could be evacuated and used for infectious disease. Municipal hospitals could be used as clearing houses for the observation and sorting out of cases of tuberculosis and for minor operations on school-children.

A local authority could not legally refuse admission to any destitute patient if his medical necessities demanded immediate hospital treatment ; accordingly in calculating the number of beds required, the highest possible and not the average demand had to be kept in mind. Consequently in the summer months a good many beds were vacant which could be used for operations which were not urgent. A consultative out-patient department then became essential. Whether such a department came within the terms of the 1875 Act as " a temporary place for the reception of the sick " was uncertain, and it was still more doubtful whether a local authority had any legal right to make a charge for out-patient treatment. Nevertheless it was essential to develop them at municipal hospitals, and where geographical conditions made this possible it would be convenient to carry out there the tuberculosis, V.D., and child welfare work of the authority. School clinics could be held there, and as far as circumstances permitted, the district medical officer—generally a member of the resident staff—should see patients there. In a word the out-patient departments of municipal hospitals and their branches could be developed into the medical centres of the district.

The unification suggested should prove of value for research and for medical education. Instruction in fevers had long been given in hospitals controlled by local authorities and everything possible should be done to bring the stimulating and critical influence of students within the walls of all the hospitals. There was in fact nothing to prevent the development of medical schools in association with municipal hospitals where facilities for teaching exist. Where they were developing on these lines, the confidence of the public in them was steadily increasing and they were being preferred by many to the voluntary hospitals. The public were beginning to feel that the hospitals belonged to them, that they could go there by right of citizenship, and not as a charity, and should anything go amiss that they had the right of protest through their elected representatives. In depressed areas local authorities had even been approached by voluntary hospitals with a request to be taken over.

The Local Government Act, 1929, came into being because intelligent administrators were impressed by the wastefulness of two systems of treatment—one for poor-law patients, and one for the public generally. If, Mr. Hastings concluded, the same Act was the means of freeing the public from the equally wasteful system of dual hospital administration, it would have proved itself of even greater value.

ROYAL INSTITUTE OF PUBLIC HEALTH

THE NORWICH CONGRESS

THIS year's congress was held at Norwich from May 15th to 20th, and was notable for the interest and originality of the communications made to the various sections, as well as for the pleasant excursions and "educational visits" which are among the valued amenities of these annual gatherings.

We noticed last week (p. 1074) the presidential address on conditions of employment. Among the discussions held by the section of state medicine and industrial hygiene was one on the

Milk Problem

opened by Dr. T. Ruddock-West, county medical officer of health for Norfolk, who said that the small amount of milk consumed per head in this country was attributable to (1) failure of the general public to appreciate the dietetic value of milk, and (2) the reluctance of the medical profession, while unanimous in opinion on the high nutritive value of milk, to advise its use, owing to the unsatisfactory state in which it reaches the consumer. Unless raw milk could be produced free from pathogenic organisms the only safeguard appeared to be universal pasteurisation. In either case it was necessary for the milk to be clean. Unfortunately the Milk and Dairies Acts and Orders had not been enforced rigidly. Legislation governing the production and sale of designated milk needed amendment. Dr. Ruddock-West said that milk naturally fell into one of two categories, clean milk and dirty milk, or in other words, tested and non-tested milk. In regard to tested milk the regulations in force in respect of Certified milk would meet the needs with certain modifications :—

(a) The herd should be tested against abortus infection every three months and reactors eliminated.

(b) Control should devolve upon the county councils and county borough councils in whose area the farms are situated.

(c) Farmers should be encouraged to produce tested milk and only a nominal fee, if any, charged for a licence.

Milk not conforming with the standards laid down should not be sold for human consumption unless it has been efficiently pasteurised, boiled, or dried. It was to be hoped that ultimately all milk would be of the tested class. Pasteurisation properly carried out would protect the consumer from the danger of infection with pathogenic organisms, though to adopt it universally without exploring other methods would be tantamount to acknowledging failure. Should other methods of dealing with the problem not prove efficacious there was always the last resort of pasteurisation. Dr. Ruddock-West was inclined to agree with the statement in the Ministry of Health Memorandum on Bovine Tuberculosis in Man, that the campaign in favour of clean raw milk must be regarded as of great potential value, and the unofficial grading of milk would constitute an important element in any comprehensive scheme for improvement in the milk-supply.

To a discussion by the section of women and children and the public health Mr. H. A. Brittain, orthopædic surgeon to Norfolk county council, contributed the opening address on the

Crippled Child

He spoke especially of the care of surgical tuberculosis from the hospital aspect, and devoted much attention to the difficult problem of diagnosis in very early cases. He was averse from postponing treatment until diagnosis was obvious to all, though this was to the benefit of statistics. At his hospital early doubtful cases were treated in various ways. In the first place the massage department, according to Platt, provided excellent diagnostic as well as therapeutic facilities; but the patient must be seen by the surgeon at least once a week. He had been confronted with a cold abscess on the tarsus after a month's massage. Absence of improvement on treatment should arouse suspicion, and any increase in the severity of the symptoms should clinch the diagnosis. Secondly, for the case which is almost certainly a strain, rest in bed at home was recommended for two to four weeks. If then symptoms had not cleared up the period of rest was repeated, and then if positive signs of a joint lesion still remained the case was treated as one of tuberculosis. In the third place, chiefly for the patient who might have an early pseudo-coxalgia, six weeks on a Thomas splint or in a plaster spica usually resulted in a complete loss of muscle-spasm and pain, but symptoms would recur in the tuberculous patient. These might seem rather elaborate precautions, but once a patient had been diagnosed as tuberculous he must be treated to the very end, remorselessly, in spite of the apparent immediate improvement. He had been taught the doctrine of immobilisation for at least one year after all pain and muscle-spasm were absent, and as his experience increased he found this period to be the minimum of safety. Mr. Brittain spoke also of the problems of the treatment of the established case, and of the residual or quiescent case in a general as opposed to a special hospital.

To this section also Miss M. F. Forrester-Brown, visiting surgeon to the Bath and Wessex orthopædic hospitals and county clinics, spoke on the

Organised Treatment of Motor Accidents

She pleaded for the earlier treatment of road injuries, which were so numerous and serious as to call for a special scheme of treatment. Information not at present available but essential to the solution of the problem included: (1) how many deaths were instantaneous, and how many occurred later and would have been preventable by more efficient treatment; (2) the degree and nature of the disabilities. Road accidents had much in common with war wounds. Organisation was needed for three stages: (1) the saving of life and limb, (2) repair of structure, (3) restoration of function, including working capacity. She pointed out the futility in rural districts preliminary of taking an accident case direct to the surgery of the local general practitioner, who more often than not would be out on his rounds. She reviewed the facilities available after the preliminary first-aid services rendered by the A.A., R.A.C., and, on certain occasions, by the Red Cross, comparing cottage hospitals to casualty clearing stations, the general hospitals to the base hospitals, and the orthopædic hospitals to the special hospitals, where the services of surgeons skilled in dealing with head and chest injuries would be available. A service possible in time of war should surely be possible in time of peace, and general constructive investigation was required.

Mr. Michael W. Bulman, consulting obstetrician and gynæcologist to the Norfolk county council, gave an address on

Abnormal Childbirth in the Rural Home

He discussed the causes of difficulty in rural midwifery—notably distances, home conditions, prejudice of patients against hospital confinement, and lack of trained nurses. With reference to prejudice, he said that many patients expected to be delivered in their own homes and saw no reason why the doctor should require special assistance. A doctor who frequently sent for a colleague to give an anæsthetic or who often advised his patients to go to hospital lost prestige. Prejudice was far more marked in the country than in towns and added to the difficulties already existing, if only by its effect on the morale of the doctor, who might feel dubious about advising treatment which he knew to be right, but which would not satisfy the patient.

Mr. Bulman quoted the following figures supplied to him by three local practitioners.

(*a*) In 32 years' practice, approximately 1400 cases.

Maternal mortality 2, of which 1 case was a placenta prævia "bled white" before sending for doctor; in the other the doctor was called in by a midwife to treat a ruptured uterus. A third case, not counted, died during labour of phthisis.

Puerperal septicæmia, 3.

Cases sent in labour to Norwich, 3.

Abnormalities dealt with included Cæsarean section, 4; decapitation, 1; craniotomy, 3; placenta prævia, 4; accidental hæmorrhage, 1; eclampsia, 4.

(*b*) In 10 years' practice, approximately 250 cases.

Maternal mortality, nil.

Cases sent in labour to Norwich, 1.

Abnormalities dealt with included puerperal septicæmia, 1; eclampsia, 1; craniotomy, 1.

(*c*) In 8 years' practice, approximately 600 cases.

Maternal mortality, nil.

Cases sent in labour to Norwich, 1.

This series include 2 cases of puerperal pyrexia and none of puerperal septicæmia.

Mr. Bulman said that (*a*) was a practitioner of the older generation and (*b*) and (*c*) had comparatively recently been translated from hospital conditions. If all practices could show similar results there would be no maternal mortality problem. The suggestions he offered after consultation with colleagues in practice in the country for the improvement of local conditions of childbirth were: (1) increase in the number of district nurses; (2) improved hospital accommodation where practitioners could, if they desire, treat their patients themselves under proper conditions. The provision of a county anæsthetist was advocated by many practitioners, since delay in obtaining a skilled anæsthetist when dealing with abnormal cases was often inevitable. It seemed to Mr. Bulman unlikely that the appointment of a special anæsthetist would overcome this difficulty. A few practitioners expressed satisfaction with present conditions and desired no change. He suspected that some of them feared, probably with justice, an increase in the already overwhelming amount of paper work and form-filling they were expected to do should any further facilities be officially provided. Any proposed maternity scheme should make provision for: (1) propaganda; (2) antenatal clinics; (3) sterile dressings; (4) district nurses; (5) consultants; and (6) coöperation between various workers. Propaganda should be directed not to emphasis on the dangers of maternity, but on the needs of the pregnant and parturient woman, and on the importance of proper supervision of pregnancy, and of proper surroundings for the confinement. Antenatal clinics should be staffed by general practitioners who must be fully conversant with modern antenatal requirements. Sterile dressings should be provided by public health authorities free of cost to necessitous persons. Though they would soon cease to be sterile, they would be far cleaner than the materials at present used as dressings by poor patients, and their use would have a good psychological effect on the patient, nurse, and doctor. All areas should have a district nurse, who should not be allowed to practise midwifery in competition with medical practitioners. The remuneration of both nurse and doctor required revision.

Among the communications to the section of veterinary medicine and agriculture was one on

A Consideration of the Treatment of Tetanus and Post-diphtheritic Paralysis

by Prof. RENÉ CRUCHET (Bordeaux). He described experiments on guinea-pigs which, he claimed, prove the phylactic action of inhalations of chloroform combined with injections of serum in tetanus and post-diphtheritic paralysis. He admitted that the results he had obtained are exactly opposed to those obtained by Debré, Ramon, and Uhry. These authors found that chloroform anæsthesia, combined with the injection of serum (either intravenously or intramuscularly, or subarachnoid injections), given in variable doses a few hours or a few weeks after the paralysing infection, had no preventive or curative action. Prof. Cruchet suggested that the negative results obtained by these workers might be due to the presence of formalin in their toxin. He was convinced from his own experiments, which he described, that in post-diphtheritic paralysis chloroform given before or after the injection of toxin protects the animal and prevents paralysis from occurring, and that chloroform has the same protective power as antidiphtheritic serum, since it is capable by itself of preventing paralysis.

Tuberculosis

Dr. S. VERE PEARSON, speaking of the arrangement of institutions in public tuberculosis schemes, quoted Dr. P. W. Edwards's figures of the after-results of artificial pneumothorax with and without phrenic evulsion. Taking the intermediate stage cases (T.B. + 2), of those who had pneumothorax with evulsion, 74 per cent. were alive after a period of three to nine years, of those who had pneumothorax alone 30 per cent. He would like to see specialist chest surgeons added as consultants and the institutions admitting cases of bronchiectasis and other non-tuberculous conditions. For this and other reasons large institutions—up to 300 beds—were preferable to smaller ones.

Dr. D. A. POWELL spoke of the need for careful diagnosis of tuberculosis in children in order to avoid unnecessary stigma. Treatment, he thought, should generally be in a separate block attached to an adult institution, except for the infrequent "phthisical" cases which local authorities should combine to segregate in a sanatorium. Other "thoracic" cases, with negative or no sputum, should be put in a sanatorium school. The "pre-tuberculous" or delicate child, predisposed by family history or environment, was best dealt with in open-air schools.

Dr. R. R. TRAIL considered the danger of isolation of the tuberculosis officer from the sanatorium with its modern methods, a danger made greater when an institution served a big area. Dispensary and sanatorium should, he thought, be regarded as one unit, so that the medical officer did not lose the opportunity of discussing with the patient his after-care. In the past the institution had been the ruling factor, but the lessons taught there were now being taken up everywhere by public health work. What we did not know in the treatment of tuberculosis was the morbidity of the disease. He would like to see the hospital with a dispensary attached and a week-end rest centre for ex-patients who came back for advice or a week-end's rest. He believed that way they would get a unified system.

Dr. F. W. Burton Fanning said that the proportion of early cases amongst admissions to sanatoriums varied from 25 to 40 per cent., and asked whether the doctor was to blame for late diagnosis, or the patient for not giving him a chance of making it. An impartial scrutiny of patients' histories made by Dr. W. E. Jolliffe and Dr. D. Wilson at Kelling, suggested delay or mistake on the doctor's part in 25 per cent., culpable delay on the patient's part in seeking advice in 20 per cent., and in 6 per cent. tubercle was discovered unexpectedly in the course of a routine examination for insurance or other purposes. Similar inquiries made in regard to 100 consecutive patients belonging to the more educated and wealthy classes suggested that the doctor had been unduly slow in making the diagnosis in 36 cases, and the patient had unduly delayed consulting him in 20. The balance in favour of the panel over the private doctor might be an example of the advantage of ready access to the tuberculosis officer with his full equipment for X ray and other investigations.

Dr. Evelyn M. Holmes referred to recent experimental work in Denmark. The Löwenstein-Jensen medium appeared to be extremely selective, enabling particles of sputum to be directly inoculated in the medium without preliminary washing. As a rule, the human type of bacillus gave a free growth after 17–21 days, the bovine type after 28–32 days; the growth obtained being quite different in appearance. Dr. Holmes gave the results of a series of tests, made over a period of months, on all the sputa received by a large laboratory which were T.B.-negative by ordinary staining methods. Over 50 per cent. gave a positive result by culture on this medium. The method had an obvious value in the examination of such things as pleural fluid, cerebro-spinal fluid, or pus obtained from joint abscesses.

MEDICINE AND THE LAW

Oysters and Typhoid Fever

After eating oysters at a St. Leonards hotel a visitor had an attack of typhoid fever which kept him away from his work for five months. He sued the hotel for damages for breach of warranty and negligence; the hotel denied liability and brought in the fishmonger who had supplied the oysters; he in turn brought in the company which sold him the oysters from its oyster-beds. There is nowadays a new procedure for these actions where third and fourth parties are involved. While the first party is attacking the second, the third and fourth are allowed to appear and cross-examine the witnesses but cannot themselves call evidence till the first issue is decided. There is a risk, of course, that the jury may take a view on the first issue which it would have rejected if it had heard the evidence subsequently called on later issues. At present the new third-party procedure is in the experimental stage; this case about the oysters is believed to have been the first of its kind to be dealt with by a jury under the new method.

As a matter of law the hotel proprietors had to admit that, if food was sold there which made the buyer ill, the seller was liable even though every care was taken to secure wholesomeness. There was no doubt the hotel management had been careful, and it was naturally argued that there was no conclusive proof that the typhoid fever was due to the oysters. The jury, however, was satisfied with the evidence given by Lord Horder and others on the plaintiff's behalf and awarded £725 damages. The case then entered the next stage, the hotel proprietors changing from defendants into plaintiffs and suing the fishmonger. He could not deny his legal responsibility in the face of the verdict already given; he therefore submitted to judgment for the sum of £725 in favour of the hotel and forthwith proceeded in turn to sue the company from which he obtained the oysters. He produced some new evidence. There had apparently been other cases of typhoid in Hastings at the material time. One of these patients had eaten oysters before his illness; did not this show that the oyster-beds had somehow become temporarily contaminated? The company which owned the oyster-beds had some fresh evidence too. Several persons at Hastings were called to say that they had had typhoid without oysters, several others to say that they had had oysters without typhoid—oysters, too, from the selfsame barrel as those which the original plaintiff had eaten at the hotel. Bacteriologists produced the records of the oyster-beds and gave them the highest character. Whereas the expert witnesses for the original plaintiff had inclined to suspect oysters as a not uncommon source of typhoid infection, the experts of the final defendants said that nowadays the suspicion was no longer justified. Dr. G. F. Buchan, medical officer of health for Willesden and author of books on typhoid fever, stated that, if there had been contamination of the beds as suggested, he would have expected a widespread outbreak of infectious disease wherever the oysters had been sent. He also thought the period of incubation of typhoid from shell-fish would normally be much shorter than in the original plaintiff's case. It might be only three days; the longer period was consistent with the disease having been contracted after leaving St. Leonards. The judge reminded the jury that no complaint had been made against the cleanliness of the fishmonger's premises or against his handling of the oysters. The jury came to the conclusion that the fishmonger had not satisfied them that he was supplied with contaminated oysters by the company. Thus, pending a possible appeal, the whole liability falls on him; he must pay the first plaintiff the damages of £725, and not only can he not pass on this burden but he must also pay the costs of the hotel proprietors and of the oyster company. Old-fashioned members of the legal profession who have not yet learnt to love the new procedure are asking whether the jury would have found in the first instance that the patient's typhoid was due to the hotel's oysters if it had heard the subsequently given evidence of those oysters' blameless upbringing.

Coroner and Doctor

At the resumed inquest at Leigh on the death of five miners in the Lancashire colliery explosion, a medical witness was questioned by the coroner (Colonel R. M. Barlow) about his action in having taken specimens of blood from four of the bodies without the coroner's permission. He explained that he understood that in any investigation after an explosion it was important for the blood of the men to be examined for carbon monoxide as early as possible; he had therefore taken samples at once. He had, he said, no object except the public good and had acted on request. The coroner, who eventually closed the incident by accepting the apologies of all concerned, stated that this was the third occasion within a year that there had been interference with a body which was in his custody. There was a question whether it did not amount to contempt of court. According to the authorities a coroner has undoubted powers of punishing contempt by fine or imprisonment, since his court has the dignity of what is called a court of record. There is less certainty as to these powers where the action of which he complains does not take place in the presence of the court. But it is in any case a common-law misdemeanour not only to prevent the holding of an inquest but also to obstruct the coroner in the course of his investigation. To tamper with a body, so that the coroner cannot be sure whether it is or is not in the same condition as when found, is clearly an interference which is technically an offence. It should be possible to arrange with the coroner's permission, or rather, indeed, under his actual direction, for prompt action in taking blood specimens in these cases. He will no doubt be fully aware of the evidential value of the earliest possible examination.

PARIS

(FROM OUR OWN CORRESPONDENT)

NEW CHIEFS FOR THE PASTEUR INSTITUTE

SINCE the almost simultaneous death of Roux and Calmette a few months ago, the choice of their successors has engaged the attention of all concerned and of sundry others. Members of the executive committee have visited the various departments of the institute and have familiarised themselves with their activities. Although many names have been mentioned in connexion with the two vacancies, it is satisfactory that at the decisive meeting on the afternoon of May 17th the appointments were made by a unanimous vote. Louis Martin, the new director, was born in 1864, and is a brother of the present Minister of Finance. Martin's introduction to the Pasteur Institute in Paris dates back to 1892. Since then he has been continuously engaged on important research work, but being in charge of the hospital attached to the institute he has never lost touch with the clinical side of medicine. In 1894 the epoch-making communication on the serum treatment of diphtheria made at Budapest was signed by Louis Martin as well as by Roux. Among the notable contributions to medical science made by the new director are those concerned with experimental tuberculosis and the serum treatment of ictero-hæmorrhagic spirochætosis and trypanosomiasis.

While Louis Martin succeeds Roux, Gaston Ramon becomes sub-director, more or less in the place of Calmette. Ramon was born in 1886, and his name has for many years been associated with the anatoxin treatment of diphtheria. At Garches, only a few miles out of Paris, Ramon has been for several years in charge of that branch of the Pasteur Institute which is concerned with the preparation of diphtheria serum. When the possibility of his being appointed director instead of sub-director was being discussed, only one serious fault was found with him; he was too young. But as this defect will be corrected automatically, it is likely that eventually Ramon will guide the destinies of the Pasteur Institute with that combination of administrative ability and scientific acumen which have distinguished his sojourn at Garches. An innovation is the provision of the Pasteur Institute with a scientific council, whose members include Prof. Jules Bordet, of Belgium, and five other eminent pupils of Pasteur—Gabriel Bertrand, A. Borrel, Mesnil, Nicolle, and Yersin. The term of office of each member of this council is for one year only, but provision is made for re-election as well as for the appointment of new members as needs arise.

A NEW TREATMENT FOR SPRAINS

Four years ago Prof. Leriche, of Lyons, published a paper which set out some unorthodox views on the genesis and treatment of sprained joints which aroused some controversy. Two of his assistants, G. Arnulf and Ph. Frieh, have now [1] brought forward evidence in support of his claims, which are the more interesting in that they promise a shortened period of invalidism. According to Prof. Leriche a sprain is not due to rupture of a ligament. It is suggested that no one has ever seen such a rupture, but that it has been taken for granted; a hypothesis has become an affirmation, and eventually a dogma. In the two cases of sprains of the ankle in which he was able to look and see, Leriche found the external ligaments to be normal, not even infiltrated with blood. He holds that the lesion in a sprain involves the sensitive nerve-endings in a joint. A vasomotor reflex is set up and gives rise to œdema, a local rise of temperature, the familiar functional disturbances, and atrophy of the muscles involved. If, now, the injured parts are promptly infiltrated with novocain, even in the presence of œdema, hyperthermia, pain, and almost complete loss of movement, normal conditions are restored in a few moments; the patient no longer suffers pain, and is able to walk home quite happily. Often, after three or four hours the pain suddenly returns, lasts for an hour or two, and then disappears. On the following day a second injection, and in a few cases a third, may be required. The ailment, thus treated, is said to last a matter of only 48 hours. If Leriche's explanation is correct, the intraligamentary injection of novocain is successful because it breaks a vicious circle by blocking the centripetal impulses travelling to the brain from the injured nerve-endings in the joint. The technique is simple, and the injections can be given even by the practitioner whose knowledge of anatomy has become somewhat rusty. With the exception of the hip, most joints are easily accessible. A few c.cm. of a 0·5 to 1 per cent. solution of novocain are deposited in the periarticular structures, near a tender point if this can be found. With proper aseptic precautions there should be no risk of infection. A few moments after such an injection the patient is told to move his joint, and is generally astonished to find how suddenly and almost completely normal conditions have been restored. This treatment is said to be of value in the differential diagnosis of injuries to the joints, its failure indicating the existence of some gross lesion requiring a radiographic examination and the special treatment resulting from its findings.

IRELAND

(FROM OUR OWN CORRESPONDENT)

PROGRESS IN PUBLIC HEALTH

THE annual report of the Department of Local Government and Public Health for the year ended March 31st, 1933, has recently been issued. County medical officers of health have now been appointed in 18 counties, which include over three-quarters of the entire population. A number of assistant medical officers of health and public health nurses on a whole-time basis have also been appointed. School medical inspection has been begun in three additional counties. The number of children examined was 112,776, or about 30 per cent. of the children on the school-rolls. School meals schemes were in operation in 41 districts, and the number of children fed rose from 19,225 to 21,117 in the year. Every area except County Longford had adopted measures for the prevention and treatment of tuberculosis. The death-rate from tuberculosis in 1932 had fallen to 1·24 per 1000 of the population, the lowest on record. The death-rate of children under one year of age had increased, the rates being exceptionally high in urban areas. In Galway the rate was 136 per 1000 births, in Waterford 132, in Sligo 124, in Wexford 113, in Dublin 100. The rate for rural areas was 59 per 1000 births. There was an increased incidence and an increased mortality from diphtheria in both urban and rural areas. In Cork, where a scheme of immunisation has been working for some years, not a single immunised child died. Of the 17 deaths from diphtheria in Cork 10 were of children whose parents had refused to permit immunisation. The number of vaccinations performed showed a substantial decline: the vaccinations represented only 64·4 of the births registered.

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[1] Presse Méd., April 14th, 1934, p. 597.

Although the report shows some progress in matters of public health the progress is slower than one has a right to expect. The appointment of a county medical officer of health for each county area was made compulsory by law in 1925, but in only two-thirds of the county areas has the law been obeyed. Moreover, it appears from a statement recently made in the Dáil by the Parliamentary Secretary to the Minister of Local Government and Public Health that there has been no addition to the number of county medical officers of health during the past 12 months. Medical inspection of school-children was established by law as long ago as 1919, and it is unsatisfactory that it is as yet only carried out for some 30 per cent. of children on the school-roll.

BUDAPEST

(FROM OUR OWN CORRESPONDENT)

AN OPHTHALMOLOGICAL LIBRARY

Dr. Emile de Grosz, well known abroad as president of the International Committee of the Campaign against Trachoma, is celebrating the completion of thirty years' tenure of the chair of ophthalmology in the University of Budapest. His clinic is famous, and in its development he has paid particular attention, among other things, to the development of a worthy library. The money grant made for this purpose by the Government was insufficient to keep abreast of scientific publications, and Grosz had to turn to some other source of support. Eventually this was found in the fees paid by the so-called "extra" patients attending the clinic, and the library proves the success of this plan. It is somewhat pathetic, however, to read the complaints made in his jubilee booklet against the high prices charged for books and periodicals, which make their purchase difficult. He mentions one book—"Kurzes Handbuch"—each volume of which costs 185 marks, while the whole work (seven volumes) cost 1780 pengos. In Hungary this is a very great sum; it is sufficient to buy quite a nice house in one of the suburbs of Budapest. The subscription price of German ophthalmological periodicals varies between 60 and 120 marks.

The clinic can boast having a complete library of antique books on the work of oculists. Most precious among them are Jacob Schalling's "Ophthalmia sive disquitio hermetico-gallenica de natura oculorum," which appeared in German and Latin in 1615 in Erfurt; Georg Bartisch's "Augendienst," published in Dresden in 1583, which, as the first ophthalmological manual, reached three editions; and a very valuable book, Vopiscus Fortunatus Plempius's "Ophthalmographia sive tractatio de oculo," the first edition of which appeared in 1632 at Amsterdam. A curious book is that written by Laurentius Heister, professor of surgery and anatomy at the University of Altdorf, "Apologia .... de cataracta glaucomate ... contra Wolhusii" (1717). This book was written by Heister in defence of his earlier published book against Woolhouse, a contemporary English physician.

DISPUTE BETWEEN THE GOVERNMENT AND BUDAPEST PHYSICIANS

Some months ago the Government informed the National Medical Association that they intended to establish a friendly society for public officials in such a way that medical attendance would be provided on the same basis as under national health insurance. The medical community forthwith revolted against this plan, which would curtail private practice and would mean advantage only to those physicians who got the posts. The association stated that the offer made by the ministry of finance could not be accepted and the latter then said that it was inclined to adopt the free-choice system, allowing public officials to choose their own doctors. The remuneration was fixed as follows: the Government was to pay for each unmarried public official with salary of less than 300 pengos (£17) monthly 12 pengos (14*s.*) a year, with other payments to correspond. Officials with salaries over 300 pengos monthly were to make their own arrangements with their doctors, the Government paying only the above fees. The National Friendly Society of Public Officials intends to establish also a dispensary employing specialists, who can be consulted by officials only upon the written opinion of the family physician. For each specialist consultation 30 fillers (about 4*d.*) will be paid by the society. The rumour of these rates of remuneration has caused consternation among doctors, who not only see in this offer the degradation of medical work, but are also clear that it will mean a general reduction of medical salaries which may be fatal to hundreds of practitioners. Hence the Medical Association, representing the whole medical profession of Hungary, has rejected the plan and resolved to boycott the society, if the Government will not raise the fees to a level worthy of the profession.

TRAINING FOR CRIPPLES.—At the annual meeting recently of the Royal National Orthopædic Hospital it was stated that last year out-patient attendances increased from 30,000 to 36,000. There is a prospect of the provision in the near future of a convalescent home of about 44 beds at Stanmore. The annual report emphasised the need of the training school for cripples which the committee hope soon to establish also at Stanmore.—The subject of training was raised also at the annual meeting last week of the Royal Cripples' Hospital, Birmingham. It was then reported that an endeavour was being made to ascertain the number of cripples requiring training, and the attitude of the responsible authorities towards grants for the purpose. The hospital's income of £56,775 left a deficit of £253. The Contributory Association paid £12,554, and a further sum exceeding £14,000 was received in respect of the treatment of contributors and their dependants, which represented 85 per cent. of the cost. The possibility of erecting wards for paying patients is under consideration.

OBITUARY

DAVID OGILVY, M.D., B.Ch. Dub.

MEDICAL SUPERINTENDENT, MENTAL HOSPITAL, L.C.C., EPSOM

As has already been announced, the death occurred on May 13th of Dr. David Ogilvy, superintendent of the London County Council Mental Hospital at Long Grove, Epsom. He had been in bad health for some time, and the death of an efficient and capable officer at the age of 61 is deeply regretted. He was the youngest son of the late Alexander Ogilvy of Dublin, and received his medical education at Trinity College, Dublin, where he graduated as M.D. in 1889, gaining the first place in surgery in the final examination. He also represented his university at Rugby football.

DAVID OGILVY

Ogilvy's whole professional career was spent in the study and treatment of mental disease. In the year of his graduation, after a short period as resident at the Criminal Asylum, Dundrum, he came to England and was appointed assistant medical officer at the West Riding Asylum, Wakefield, where he had the advantage of serving under the late Bevan Lewis, whose pioneer work in psychiatry was remarkable. He then joined the L.C.C. service and was appointed an assistant medical officer in the Banstead Asylum under the late Claye Shaw. In 1902 the Horton Asylum was opened, and Ogilvy was appointed second assistant, being soon promoted to be senior medical officer. Here he remained working under the late Colonel J. R. Lord until he was selected in 1912 to succeed Sir Hubert Bond at the Epsom (Long Grove) Mental Hospital, Bond having become a Commissioner in Lunacy.

We owe to a colleague in the L.C.C. mental service the following appreciation of David Ogilvy. "On appointment to Long Grove, Ogilvy realised fully the distinguished heritage committed to his care, and unsparingly devoted himself to the great work he found there. He took a special interest in the development of occupational therapy on progressive lines, and it was due to his persistent advocacy that a male occupations therapist was appointed for the male division, with such progressively satisfactory results in this form of treatment. He was a man of strong personality, courageous, straightforward, and tenacious of purpose, which was always devoted to the welfare of his hospital. His transparent honesty and sense of justice in connexion with what he conceived as right, was rewarded by the respect and affection of his staff, and from his patients his humanity, kindliness, and devotion to duty secured a ready response. Amongst his medical colleagues he held a special place, and his fearless manner, outspoken speech, and readiness to fight for a good cause endeared him to all who knew him well. One might differ from Ogilvy, but one could not help liking him, and to his more intimate friends he was always affectionately known as 'O.' He was a member of the Royal Medico-Psychological Association, and he took a deep interest in the Mental After-Care Association, on the council of which he served.

"Whether or not Ogilvy was temperamentally an optimist, his attitude towards life was certainly one of determined optimism, not lost in his last illness. He was approaching the natural termination of his service, and a well-earned retirement, into which he would have taken the good wishes of his fellow-workers, had destiny so decreed. He leaves a widow and three children, to whom all who knew him will tender their heartfelt sympathy."

No more conventional portrait of Dr. Ogilvy was available for publication.

RICHARD H. C. GOMPERTZ, M.B., B.S., B.Sc. Lond.

THE death of Dr. Richard Henry Cyril Gompertz, of Barnstaple, has removed from North Devon a practitioner whose public and voluntary work, discharged in addition to the duties of a large practice, benefited the neighbourhood in a noticeable way. Born in 1877, at Madras, the son of an officer in the Indian Army, Gompertz was educated at Bedford Grammar School and King's College, London, and received his medical education at King's College Hospital. Here he was a distinguished student, being both junior and senior Cloth Workers' scholar and Sambrooke scholar. He graduated M.B., B.S. Lond., in 1907, with honours in medicine and surgery, obtaining a gold medal, and later was appointed surgical registrar to the hospital and demonstrator in physiology in the school. At the outbreak of war he served with a temporary commission in the R.A.M.C., and was mentioned in despatches. At the close of hostilities he was for a time medical officer to Berkhamsted School, while at the same time he developed his knowledge of radiology and took part in public duties by coöperation with the St. John Ambulance Association. In 1923 he joined a firm of practitioners in Barnstaple, and in addition to his routine work, was appointed to the charge of the X ray department of the North Devon Infirmary. He continued his close interest in ambulance work, was medical officer to the local Voluntary Aid Detachment, lectured in connexion with the St. John Ambulance Association, and was medical referee under the Workmen's Compensation Act. He was a widely read man, especially in psychology and the later theories of evolution, while he was also a considerable artist and botanist and a prominent lawn tennis player. An all-round and accomplished man, his death at the age of 57 is a loss not only to his circle but to the medical profession.

Dr. Gompertz married in 1920 Marjorie Whitfield, and leaves a widow and two children.

WILLIAM PRINGLE MORGAN, M.B. Dub., D.P.H.

Dr. Morgan, who died at Seaford, Sussex, on March 20th, in his 73rd year, was a practitioner who left a deep impression on those he had served and in whose activities he had shared. He was born at Rostrevor, Northern Ireland, the son of the Rev. Thomas Morgan, educated at Dundalk Grammar School, and Trinity College, Dublin, where he graduated in 1885. In the following year he settled at Seaford, and shortly after took his D.P.H. In 1889 he married Miss Ethel Eastwood of that town—or village as it was then—and for 45 years he watched its growth and consolidation. In due time he became chairman of the urban district council, being elected in two succeeding years. In masonic circles he was well known, being master of the Seaford lodge and in 1911 provincial junior grand deacon. Although over age he served in the war at Malta and Salonica. He was a member of the Sussex Archæological Society and of the Society of Sussex Downsmen; and was chairman of the local branch of the League of Nations Union. He took an active part in the work of the B.M.A., and in 1925 was president of the Sussex branch. A colleague writes :—

" Morgan believed intensely in Voltaire's principle 'il faut cultiver notre jardin'; but for him, highly endowed though he was, it was not just a matter of watering, but of sowing and then watering. He did not expect himself, or anyone, just to sit with their inherent gifts. To the end he retained a fascinating and informing interest in his work, in his pursuits, in literature, in music. His leisure was always utilised; he never lounged in thought or action. He hated slovenliness of speech or talk, and his own finely spoken words and ringing enthusiasm will go on echoing through many people's lives. Such a man cannot be easily forgotten."

Mrs. Morgan survives him, together with two daughters and two sons, of whom the elder is ophthalmic surgeon to Guy's Hospital.

WILLIAM BROGDON PATERSON, M.B. Edin.

THE death of Dr. W. B. Paterson, at his home at Aigburth, on May 11th, removes a practitioner who was widely known and respected in Liverpool. He was born in 1865, his father being minister of Tranent, East Lothian. He was schooled in medicine at Edinburgh, where he qualified M.B., C.M. in 1887, afterwards becoming resident physician at the Cowgate Dispensary. He went to Liverpool as house surgeon to the Royal Southern Hospital, was for some time medical officer to the Liverpool Medical Mission, and then became a partner of the late Dr. John Grimes, of Grassendale, with whom he remained until 1903. Until a few years ago he was associated in partnership with Dr. H. R. Hurter, of Cressington. His colleagues honoured him at various times by electing him first librarian and later vice-president of the Liverpool Medical Institution.

Dr. Robert Coope writes : " Paterson's stocky figure, with bright and kindly eyes shining from behind rather shaggy eyebrows, became well known to the men and women of all walks of life who made up the field of his large and widely extended family practice. His skill as a practitioner kept pace with the rapid advances of medicine, and to his professional duties he brought a discipline and integrity of purpose which left him with neither time nor inclination to waste words or energy on small talk or trivialities. At times life had hit him hard, but he emerged out of disappointment and sorrow to a fine sensitivity and sympathy, which was all the stronger for his reticence.

" His love of the beautiful in life brought him delight in art, in the engaging loveliness of children, and most of all in the contacts of his daily work. He possessed that austere sense of fitness and restraint which is associated with the classical Greek spirit, but with it were fused a serene kindness and an unusual power of feeling. A man's relations with children are a revealing touchstone of his quality; I had the intimate privilege of seeing how, busy as he was, he treated children with winning dignity and seriousness, so that they loved him and regretted that he could not stay longer on his visits. I learned, too, his power not only of saying the right thing but of giving that rare sympathy which has an astringent and strengthening quality in it."

FRANCIS SEYMOUR KIDD

A COLLEAGUE of Mr. Frank Kidd writes : " May I add a few words to the obituary notice published in THE LANCET on May 19th? In 1913 Frank Kidd started the genito-urinary department at the London Hospital, which from small beginnings has become one of the largest special departments, and soon established his reputation as one of the leading urologists in England; his enthusiasm for this branch of surgery was originally stimulated by his old chief, Mr. Hurry Fenwick. As Kidd's reputation increased so did his private practice, and by the end of 1920 he found that his health was unable to stand the strain of both his large practice and his arduous work at the London; so on medical advice, and greatly to his own sorrow, he resigned from the London and did no more hospital work except in the capacity of consulting surgeon to St. Paul's Hospital. But although he had left the hospital he loved, he never allowed his enthusiasm for urology to wane, and in 1920 was a member of the organising committee that founded the urological section of the Royal Society of Medicine. He acted as honorary secretary of the section from 1921 to 1923, and in 1927 was president. He read many papers at the section and contributed frequently from his extensive experience to the discussions. In 1928, in collaboration with Mr. Winsbury-White, he worked hard in starting the *British Journal of Urology*. The first number was published in March, 1929, and Kidd's enthusiasm enabled him to acquire an editorial committee drawn from the best-known British urologists, while he himself became editor, with the assistance of Winsbury-White, who later carried on alone when Kidd's health broke down. From the start the publication was a success, and it is a general hope that it will remain as a lasting memorial to its founder. Through text-books and papers on urological subjects, Kidd's name was well known throughout Europe and America; he was twice invited to address the American urologists in conclave, going to the United States for the purpose, while he acted as secretary to the British section of the International Association of Urology.

" As well as having such an extensive knowledge of his subject, Kidd was a very skilful operator, and nothing was too much trouble where his patients were concerned. Into those of us who had the pleasure and privilege of working with him, he was able to instil his own enthusiasm; he was our loyal colleague and a generous friend to those who worked with him. Unfortunately his physique was not in keeping with his restless energy; he found it very difficult to relax, so that the strain told more and more on his health, and in November, 1932, following a motor accident, his health broke down and he had to retire from practice."

ENLARGEMENT OF SALISBURY INFIRMARY.—It has been decided to enlarge this hospital from 171 to 226 beds at a cost of £85,000, to be provided by public subscription. There will, in addition, be a paying ward of 15 beds. The enlargement is intended mainly to provide for specialist needs. A proposal to build an entirely new hospital at a cost of £900 per bed was rejected. Last year 2429 in-patients were admitted, who stayed on an average 19·7 days.

CORRESPONDENCE

SANITY IN A MENTAL WARD

To the Editor of THE LANCET

SIR,—The letter of Dr. Edwin Goodall in your issue of May 19th—so convincingly sound—will I am sure be welcome to all those practising and interested in psychiatric medicine. As he truly states : " This provision, regarded as elementary, and long since made on the continent, has been urged for this country to my personal knowledge for 40 years—and probably longer." But the opening of Shenley Mental Hospital by the King and Queen on May 31st may create a revolution as unique as any " opening " in the hospital world of medicine. Is it not another royal example of profound interest in British medicine ? If it should lead constructively to a further type of general hospital similar to that at the Johns Hopkins Hospital, Baltimore, we shall be advancing in preventive medicine. With mental cripples on one side and physical cripples on the other, what can be more ideal ?

I am, Sir, yours faithfully,

Ryhope, May 21st. JOHN FREDERICK BRISCOE.

PANCREATIC INSUFFICIENCY IN GRAVES'S DISEASE

To the Editor of THE LANCET

SIR,—Encouraged by the favourable criticism of some of my colleagues I am bringing to your notice a method of treating exophthalmic goitre by the oral administration of an extract of the pancreas. Since 1931 I have treated with uniform success a series of ten patients of ages ranging from 23 to 57. The conditions of my work do not allow me to present records with detailed metabolic investigations, but I have good reason to be satisfied of the value of the remedy, and would be therefore glad of the coöperation of those with facilities for examination and continuous treatment on a larger scale.

Authorities on Graves's disease may admit an associated lesion of the thymus gland, suprarenal cortex, liver or other lymphoid tissue ; but the pancreas is not singled out as showing pathological changes. Yet outside the usual Graves's syndrome we get such symptoms as diarrhœa, glycosuria, and increased appetite, indicating that the pancreas is possibly involved. It seems to be firmly established that there is deficiency of iodine in the thyroid gland in Graves's disease, and Marine holds that the gland enlargement represents a compensatory hyperplasia. The deficiency may, he suggests, arise either because there is a diminished amount of iodine in the diet, or because the body for some reason requires an increased supply, or because there is something which blocks tissue oxidation. May not this block be in the pancreas, impairment of whose function leads to imperfect absorption of fats and proteins ? In practice I have found that pancreatic extract will sometimes control diarrhœa of long standing, and in a very severe case of Graves's disease of 18 years' duration I gave the extract to combat typical pancreatic stools. The diarrhœa cleared up in a day or two and to my astonishment the large goitre disappeared within a fortnight, and the patient's general condition improved out of all knowledge. This encouraged me to try the extract in the case of a woman who had been treated for some time with Lugol's iodine. She had all the symptoms of Graves's disease, well marked, with occasional loose stools ; but after six months' treatment there was no longer any evidence of thyrotoxicosis. I shall not here give details of the others treated, but it is interesting to note that out of ten the only case which has not completely reacted to the treatment is one in which pancreatic disease is well established ; and even here the cure is almost complete.

As a rule it takes from six months to a year for the usual symptoms to disappear, but the patients carry on meantime with their ordinary duties. The blood pressure and basal metabolic rate show improvement fairly quickly and the patients soon notice an amelioration of their symptoms. In some cases I have given the extract alone ; in others I have combined Lugol's iodine with it. The preparation used is Oppenheimer's palatinoids Pancreatin grs. 5, given thrice daily immediately before meals.

Prof. C. Harington in his book the "Thyroid Gland," in discussing the possibility of lesions of the pituitary gland and suprarenal cortex in thyrotoxicosis, sums up thus :—

> "Neither of these hypotheses can be advanced as a serious theory of the ætiology of Graves's disease. They are discussed here because it seems to the writer that it is almost certainly on some such lines that the explanation of the problem of Graves's disease will eventually come. The only practical means at present of handling the condition consists of a palliative surgical measure devoid of any rational basis."

Does not insufficiency of the pancreas fill the gap to which Prof. Harington refers ?

I am, Sir, yours faithfully,

Liverpool, May 16th. C. BAIRD MACDONALD.

UNFORTUNATE PUBLICITY

To the Editor of THE LANCET

SIR,—I write to disclaim all responsibility for the publicity given to my name in a professional capacity in the lay press. Recently my name appeared in a newspaper article in which the following statement was made : " At first-hand from the doctors and their patients themselves, I have learned how all these astonishing operations are being performed." I have never discussed my professional work with representatives of the lay press, and have never conveyed information to them directly nor by any indirect channels. Requests for interviews have been consistently refused.

I am, Sir, yours faithfully,

J. W. TUDOR THOMAS.

Clifton Lodge, Cardiff, May 20th.

MEASLES SERUM IN A CASE OF ULCERATIVE COLITIS

To the Editor of THE LANCET

SIR,—The following case is, I think, of sufficient interest and importance to justify its being reported. An otherwise healthy young girl, aged 21, was recently under my care suffering from her third attack (within three years) of ulcerative colitis, which had been going on uninterruptedly for just over three months. Her previous attacks were less severe and lasted approximately one month and two months respectively.

On expectant treatment she was doing badly, passing blood and mucus about six times a day, and an ileostomy was contemplated. As her brother, who had been in contact with her, developed a typical attack of measles, it was deemed advisable to immunise her, as she had not previously had this disease. She was accordingly given 12 c.cm. of convalescent measles serum intramuscularly into the thigh. Within 48 hours there was marked improvement in her condition, both local and general, and within a week the blood and mucus, which had by this time increased sufficiently to cause some concern, entirely disappeared and her motions became perfectly normal.

I have heard of other cases of ulcerative colitis that have cleared up equally dramatically after a blood transfusion. I would, therefore, ask those who have an opportunity of seeing and treating a number of cases of this very distressing, though fortunately rare, disease, to try this method of treatment and publish their results. My feeling is that ordinary human serum would act as well as convalescent serum.

I am, Sir, yours faithfully,

L. CARLYLE LYON, M.B.

Creffield-road, Ealing, May 14th.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

Whitsuntide Adjournment

ON May 17th the House of Lords adjourned for the Whitsuntide recess until May 30th. The Royal Assent was given to a number of Acts, including the Births, Deaths and Marriages (Scotland) (Amendment) Act, and the Water Supplies (Exceptional Shortage Orders) Act.

In the House of Commons on May 18th the Birmingham United Hospital Bill was read the third time. The House adjourned for the Whitsuntide recess until May 29th.

Psycho-physical Tests for Drivers

When the Road Traffic Bill was considered by a Standing Committee of the House of Commons on May 17th, on Clause 5 (Tests of competence to drive of new applicants for licenses and of offenders ordered to be tested), Sir ERNEST GRAHAM-LITTLE moved an amendment providing that applicants should be required to pass a prescribed psycho-physical examination for fitness and subsequently the prescribed test of competence to drive. Tests had been worked out by the Institute of Industrial Psychology in many other walks of life, and the experience which had been gained by expert observers in studying the causes of accidents in factories was a very material argument for the consideration at any rate of the subject in the case of motor accidents.

There were 106,000 factory accidents in one year, of which 66,000 were considered by experts observing them to be due not to carelessness or the act of God, or anything else fanciful, but to real conditions in the personnel of the factory. In the case of the breakage of crockery in restaurants when the employer tried to meet it by punishment for carelessness, fines, and so on, the progress made was negligible, but when experts studied the matter a very different state of affairs was revealed. When psycho-physical tests were instituted in these cases a very remarkable result followed, and breakages were greatly reduced. They were very commonsense tests. Fatigue, rush hours, bad ventilation, poor lighting, and emotional states all entered into the production of accidents. The practical utility of the tests was immediately demonstrated, and it was instructive to note that in a report by the Chief Inspector of Factories in 1932 he stated that it was of very little utility to go on trying to meet factory accidents by improvements in machinery. They had practically exhausted the usefulness of that line of research. When they began to treat the human factor progress had been enormously greater and it was the human factor that he proposed they should consider in this amendment.

HUMAN FACTOR IN ACCIDENTS

What was the estimated ratio of the human factor in the production of accidents upon the roads? That was very difficult to estimate, because unfortunately the evidence had been derived from uninstructed sources. Policemen and coroners had been the principal witnesses, and chief reliance had been placed on their statements as to the causation of accidents. But where expert investigation had been made it had been conclusively shown that it was the same cause in road accidents as had operated in factory accidents. The human factor was by far the more important of the two producing that result. He (Sir E. Graham-Little) had been in close touch with the Institute throughout. The director had himself given here a proposed category of tests, and it was that combination which he suggested might be considered as being a practical application of this amendment.

The tests were divided into three classes. The first was the investigation of factors determining the capacity of response to an emergency. Under that heading three inquiries were made. The first quality that was tested in that way was the simple reaction time. The test was made by the person tested pressing upon certain levers when certain lights came into view, and the test was the *simple reaction time undisturbed by any other factors.* A very remarkable fact that emerged was that response was very different in different persons. It might vary from half a second to a second and a half—a difference of 150 per cent. The next test was the reaction time confronted with distraction, and a very ingenious method had been devised. A film was exhibited and the observer was required to press the levers while looking at the film. In the case of an interesting film the reaction time was very materially increased. The third test was that of vigilance. That was made by putting on a film and cross-examining the tested person. He must remember something about the film as well as press the levers when the lights went up. That was again a more prolonged reaction time. Under the second heading were tests for ability to make rapid and accurate judgment of the size of objects, the space between objects, distances and speeds—a very simple apparatus and an extraordinarily efficient one. The third category was tests of vision both with regard to acuteness of vision and the condition of the eye muscles—a highly important factor in estimating distances. He did not suggest that they should include a medical test. It would be much too expensive, and experience had shown that gross disabilities, as, for example, hearing, came out in the application of the physical tests. They could tell at once if a man could not hear when one was talking, and attention might be directed in that way to the importance of a professional examination of the candidate.

THEORY AND PRACTICE

The scientific accuracy of the investigations might be estimated in this way. The correlation between the scores made at the Institute and the accident records of persons tested in a large number of cases had been singularly close. There was no doubt that from the scientific point of view the tests were absolutely to be relied upon. He would emphasise the importance of the reaction time by one statement.

It had been said that one could stop in the distance of one's car own, which was demonstrably impossible. There was a formula for estimating braking distance which had been mathematically worked out and was accepted by motorists' associations, and to the braking distance they must always add a figure which varied with the reaction time, and on the average, as a rough estimate, it might be taken that if one wanted to get the stopping distance they must add to the braking distance a figure in relation to the velocity of the car in miles. If one was going 30 miles an hour one must add a distance of 30 feet. That was a very material accentuation of the problem of stopping, and he thought it was often entirely ignored by motorists.

APPLICATION OF THE TESTS

The actual application of these tests had been made on quite a large scale, not unfortunately in this country, although the greater part of the work had been done in this country. It had been applied far more extensively in other countries, notably in France, the United States, and Germany. Some figures had been given of experience in Paris.

In one comparison of a certain number of private cars, lorries, and practically all vehicles not omnibuses or trams the accidents in ten years were investigated, and it was found that the accident rate increased in that period by

PANEL AND CONTRACT PRACTICE

Vexed Points in Certification

THE note under this heading in our issue of April 28th (p. 919) has led to rejoinder based, we think, partly on misunderstanding. For instance, Dr. X. writes: "Your notes on giving certificates to pregnant women show that the approved societies have again attempted to increase the clerical work of panel practitioners, but with all their ingenuity the societies have not evolved a formula which will enable me to state the reason why I consider a case, such as a pregnant land worker, unfit for work. English medicine is still an affair between doctor and patient which is conducted viva voce. Few patients ever read their medical cards; fewer still their certificates. If one simply wrote instructions on the certificate and then asked the patient why they were not followed, the answer would be that the doctor did not tell the patient. To write these instructions is simply to inform the society what they are, nothing more." In making his point Dr. X. is not quite fair to the approved societies, for the suggested rules were arrived at by a meeting between representatives of approved societies and members of the Insurance Acts Committee, and were only simply a consensus of opinion. They have not yet even been considered by the Ministry of Health. Nevertheless one can hardly imagine a doctor writing instructions on a certificate to come again on a particular day without at the same time instructing the patient by word of mouth to do so. And it may well be asked: How can a society find out how verbal instructions to attend are obeyed unless they are confirmed in writing on the certificate?

Commenting on the statement of approved society representatives that it is rare to find filled in on the certificate the date on which the patient is to see his doctor again, Dr. X. remarks: "It is simply untrue to say that 'patients are apt to attend weekly'; they attend when they are told to do so, and the most practical method of securing this is to limit the amount of medicine they receive to what they can consume in the interim. If they then fail to attend, a question as to how they expect to get well without medicine will do more to secure attendance than any effort the society can make. Most patients are grateful to find they are not obliged to make attendances specially for certificates. The system of attendance on the same day of the week finds favour with some agents who like paying definite weekly sums instead of working out the sums in sixths and paying the number of sixths to which a man is entitled. The much abused English monetary system is peculiarly adaptable to the division of small sums into sixths. It would be well for societies to scrutinise their agents' reports to discover which are paying the bulk of the claims in weekly sums and which in four-sixths, seven-sixths, and so on. Such a list would inform them which agents are doing their work and which, by avoiding a little extra trouble, are increasing work for doctors and attendances for patients." But Dr. X. seems to overlook that on the question of payment for parts of a week in sixths agents are bound by the rules of their societies: Some allow payment up to the date of certificate, others only to the weekly pay-day; others, again, pay up to the date of the weekly pay-day provided a certificate has been given during that week—thus often paying a day or so beyond the date of the certificate.

Dr. Y. raises the question of breach of confidence on the part of the doctor who certifies pregnancy. "Many women," he writes, "are content to allow their agents to remain in ignorance of what their doctors know. It is perhaps too much to contend that to inform the official of a London society who does not know the woman that she is seven months pregnant is a breach of professional confidence, but the certificate may be seen by the local agent. If she runs me in for allowing her agent to know when to expect the confinement, will the fact that I cannot obtain sick pay for her without running the risk of doing this be an adequate defence?" The answer, of course, is that there is no breach of confidence in writing anything upon a certificate, marked confidential, given to the patient by the doctor. It is the patient who hands it or sends it to the head office or to the local agent; it is therefore the patient, not the doctor, who is responsible for the publicity of its contents. There is, however, a provision in the certification rules whereby a doctor may give an indefinite diagnosis on a certificate for the patient to hand to the society; but if he does so he must at the same time inform the regional medical officer of the precise diagnosis, and let the society know that the certificate is not as precise as it might have been. The form provided for this purpose is Med. 40 D. It might be used where pregnancy occurred in a single girl or in the case of venereal disease where loss of employment or other damage would result if the precise diagnosis were to become known locally. It could hardly be used to hide the probable date of confinement in a known case of pregnancy.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED MAY 12TH, 1934

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 3 (last week 2); scarlet fever, 2658; diphtheria, 1163; enteric fever, 25; acute pneumonia (primary or influenzal), 1060; puerperal fever, 57; puerperal pyrexia, 110; cerebro-spinal fever, 22; acute poliomyelitis, 5; acute polio-encephalitis, 2; encephalitis lethargica, 7; dysentery, 4; ophthalmia neonatorum, 90. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on May 21st–22nd was as follows: Small-pox, 14 under treatment, 0 under observation (last week 9 and 3 respectively); scarlet fever, 1594; diphtheria, 1669; measles, 2493 (last week 2740); whooping cough, 304; puerperal fever, 32 mothers (plus 11 babies); encephalitis lethargica, 259; poliomyelitis, 3; "other diseases," 125. At St. Margaret's Hospital there were 12 babies (plus 6 mothers) with ophthalmia neonatorum.

Deaths.—In 121 great towns, including London, there was no death from small-pox or enteric fever, 78 (30) from measles, 10 (2) from scarlet fever, 35 (4) from whooping-cough, 42 (12) from diphtheria, 45 (16) from diarrhœa and enteritis under two years, and 48 (5) from influenza. The figures in parentheses are those for London itself.

Deaths from measles and whooping-cough are steadily on the decline, but 11 fatal cases of measles were reported from Liverpool, 7 from Newcastle-on-Tyne, and 4 from Barnsley, while Liverpool also reported 8 fatal cases of whooping-cough, Birmingham 5. Diphtheria proved fatal in 3 cases at Ilford and 3 at Birmingham.

The number of stillbirths notified during the week was 208 (corresponding to a rate of 44 per 1000 total births), including 47 in London.

MEDICAL NEWS

University of Oxford

Dr. C. F. T. East and Dr. C. P. Symonds have been nominated by the general-medical electorate to the board of the faculty of medicine.

Dr. John Carew Eccles, Staines medical fellow of Exeter College, has been elected to an official fellowship and tutorship of Magdalen College.

University of London

At a meeting of the senate on May 16th the title of university reader in bacteriology was conferred on Dr. L. P. Garrod, bacteriologist and lecturer in bacteriology to St. Bartholomew's Hospital medical college. Dr. G. R. Cameron, since 1933 pathologist to the Queen Mary's Hospital, Stratford, was appointed university reader in morbid anatomy at University College Hospital medical school.

The degree of D.Sc. in physiology was conferred on Dame Louise McIlroy, university professor of obstetrics and gynæcology at the London School of Medicine for Women.

Royal College of Physicians of Edinburgh

The Kirk Duncanson fellowship for medical research will shortly be awarded. Particulars will be found in our advertisement columns.

Royal College of Surgeons of Edinburgh

At a meeting of the College held on May 16th, with Dr. A. H. H. Sinclair, the president, in the chair, the following candidates having passed the requisite examinations were admitted Fellows :—

Paul Joseph Fogarty, M.B. N.Z. ; Samuel John Campbell, M.B. Belf. ; Samuel Davidson, M.B. Edin. ; David John Davies, M.B. Lond. ; Morgan David Arwyn Evans, M.D. Wales ; John Malcolm Fosbrooke, M.B. Edin. ; Kennedy Hunter, M.B. Belf. ; Morris Louis Kaufman, M.B. Liverp. ; David Henry Klugman, M.R.C.S. Eng. ; James Lawrie, M.B. Edin.; Charles Roy Macdonald, M.B. Edin. ; Donald Couper Mackenzie, M.B. Edin. ; John Campbell Mackenzie, M.B. N.Z. ; Alfred Ian Lennox Maitland, M.B. Glasg. ; Ian Morison Orr, M.B.Glasg.; Llewelyn Courtenay Palmer-Jones, M.B. Edin. ; Jack Polonsky, M.B. Liverp. ; James Henry Gordon Robertson, M.B. Edin. ; Brian Powell Robinson, M.R.C.S. Eng. ; and Dorothy May Satur, M.B. Madras.

The following candidates received the higher dental diploma :—

Geoffrey Brocas Hunter, Reginald Edward Clarke, John Walter Shaw, and Horace Hayman Boyle.

University of Liverpool

The following awards have recently been made in the faculty of medicine :—

Gold medal for medicine, J. K. B. Waddington, proxime accessit : Margaret F. Procter ; clinical school exhibition (clinical medicine), A. J. McCall ; A. C. Rich prize (clinical medicine), E. W. Jones ; gold medal for surgery, A. C. Brewer ; Derby exhibition (clinical surgery), J. G. Sheldon ; gold medal for obstetrics and gynæcology, A. J. McCall, proxime accessit : Margaret F. Procter ; and Robert Gee prize (diseases of children), V. K. Drennan.

University of Dublin

The fourth series of the John Mallet Purser lectures will be delivered by Prof. C. U. Ariens Kappers, director of the Institute for Brain Research of Amsterdam, in the department of physiology of the medical school. On Tuesday, June 12th, he will speak on the differences in the effects of various sensations on the structure of the nervous system ; and on Thursday, June 14th, on the so-called Semitic and Aryan peoples in the Near East. The lectures are open to the public and will be given at 5 P.M. each day.

Research Defence Society

The annual general meeting of this society will be held at the London School of Hygiene and Tropical Medicine, Keppel-street, London, W.C., on Tuesday, June 5th, at 3 P.M., when the eighth Stephen Paget memorial lecture will be delivered by Mr. Joseph Barcroft, F.R.S., professor of physiology in the University of Cambridge. His subject will be experiments on man. Lord Lamington, the president, will take the chair and he will be supported by Sir Arthur Stanley and Prof. A. V. Hill, respectively chairman and vice-chairman of committee.

Prof. F. E. Tylecote, F.R.C.P., has been placed on the commission of the peace for the city of Manchester.

South-West London Medical Society

The Bolingbroke lecture will be delivered to this society at the Bolingbroke Hospital, Bolingbroke-grove, Wandsworth Common, at 9 P.M., on Wednesday, June 6th, by Mr. Comyns Berkeley, who will speak on Some Things I have Learnt. The arrangements previously announced have been cancelled.

National Smoke Abatement Society

This society, whose president is Dr. H. A. Des Vœux, is arranging a symposium on smokeless open-grate fuels. The papers will be delivered at an open meeting to be held at 71, Eccleston-square, London, S.W. 1, on Friday, June 8th, at 11 A.M., and there will be a discussion. The address of the general secretary is 23, King-street, Manchester 2. The annual conference of the society will be held at Glasgow from Sept. 27th to 29th.

Glasgow Post-Graduate Medical Association

This association has arranged for a general medical and surgical course to be held from August 20th to Sept. 14th. The mornings will be occupied with general medicine and surgical diagnosis and minor surgery at the Royal Infirmary and the Victoria Infirmary, while the afternoons will be spent in studying special subjects. Clinical assistantships are also available in some of the institutions taking part in the work of the association. Further information may be had from the secretary of the association at the University, Glasgow.

Committee against Malnutrition

Under the auspices of this committee, whose aims were described in our issue of April 21st (p. 865), a public meeting will be held on Wednesday, June 13th, at 8 P.M., at 34, Red Lion-square, Southampton-row, London, W.C., to discuss "the steps to be taken in combating the widespread undernourishment of men, women, and children." Among the speakers will be Dr. Stella Churchill, Prof. J. B. S. Haldane, F.R.S., Dr. R. D. Lawrence, and Dr. R. A. Lyster. Tickets at 1s. each may be had from the hon. secretary, Mr. F. Le Gros Clark, at the headquarters of the committee, 19c, Eagle-street, W.C. 1.

Institute of Medical Psychology

A short course of lectures, on the Approach to the Psychoneuroses, for practitioners and medical students, will be held at the new premises of this institute, Malet-place, London, W.C., from June 18th to 29th. The lectures will be at 4.45, 5.45, and 8.15 P.M. daily, from Monday till Friday, and there will be demonstrations on Saturday, June 23rd, from 2.30–5 P.M. Further particulars may be had from the hon. lecture secretary at the institute.

University College Hospital

The report for 1933, the centenary year, shows a total of 8624 in-patients in the main (5542), the obstetric (1868), and the Royal Ear (1214) hospitals. There were 78,570 out-patients, 54,583 of whom attended the main hospital. The in-patients' average stay was 21·78 days, and their average statistical cost per head was £2 19s. 7d. There is "urgent need" for extending the child welfare and antenatal departments, and the provision of pay-beds "is hardly a less pressing necessity." A site in the near neighbourhood of the Obstetric Hospital is available for these extensions, which are estimated to cost £100,000. The policy of discouraging out-patient attendances for trivial complaints has reduced the number of general medical out-patients. In an endeavour to solve the problem of waiting in the out-patient departments, an intensive timing of patients from the time of arrival to the time of departure has been carried out in the main hospital over a period of three weeks, covering about 6000 cases. The returns show that, on an average, casualty patients are kept 1½ hours, old out-patients 1¼ hours, and new out-patients (whose histories have to be taken) 2¾ hours. These periods of waiting are not regarded as excessive.

West London Hospital

The report for 1933 presented to the annual meeting last week states that the extensions to the hospital, costing about £32,000, are to be begun. Three old houses on the Hammersmith-road, forming the south-eastern frontage of the hospital, will be demolished, which will enable a new building to be erected on the site. It will contain a new casualty department, with operation theatre, and X ray department. The Earl of Athlone, who presided, said that it was unfortunate that the urgently needed pathological laboratory must be left out of the scheme for the present. The money in hand for the extensions now amounts to £27,000.

Bolingbroke Hospital, Wandsworth Common

In the report for 1933 the governors lay urgent emphasis upon the need for replacing the old "mansion part" of the hospital, at a cost that will exceed £60,000. The 2127 new in-patients remained 19·23 days each on the average, and cost £3 per head per week; the statistical cost of each occupied bed was £145 19*s.* 11*d.* Although the 13,537 new out-patients were an increase of 413, their attendances decreased by 1108. The new system of inquiring into the financial status of out-patients "has proved in every way satisfactory." The pathological laboratory was opened during the year, and has been used to its full capacity. There was a deficit of £1082, caused almost entirely by the cost of renovations.

Appointments

GIFFORD, J., M.B., Ch.B. Edin., has been appointed Medical Superintendent, Prestwich County Mental Hospital.

MACKAY, W., M.B., Ch.B. Glasg., Certifying Surgeon under the Factory and Workshop Acts for Strathdon, Aberdeenshire.

Vacancies

For further information refer to the advertisement columns

Ashton-under-Lyne, District Infirmary.—H.S. At rate of £150.
Bagdad, Royal College of Medicine.—Chair of Materia Medica.
Beckenham, Bethlem Royal Orchard, Monks Orchard.—Sen. Asst. Phys. £700.
Birmingham, Dudley-road Hospital.—Jun. M.O. At rate of £200.
Birmingham Maternity Hospital.—Res. M.O. and Reg. £200.
Brighton, Royal Sussex County Hospital.—H.S., and Cas. H.S. £150 and £120 respectively.
Burma, Rangoon Municipal Corporation.—Health Officer. Rs. 1300.
Burton-on-Trent, Bretby Hall Orthopædic Hospital.—Locum Res. Asst. M.O. At rate of £350.
Burton-on-Trent General Infirmary.—Cas. O. and H.P. £150.
Cancer Hospital, Fulham-road, S.W.—H.S. At rate of £100.
Cardiff, Welsh National School of Medicine.—Demonstrator in Materia Medica, &c. £50.
Charing Cross Hospital Institute of Pathology, W.C.—Part-time Bacteriologist and Hæmatologist. At rate of £250.
Chelsea Hospital for Women, Arthur-street, S.W.—Jun. H.S. At rate of £100.
Chesterfield, Walton Sanatorium.—Locum Res. Asst. M.O. At rate of £350.
Children's Hospital, Hampstead, N.W.—Res. M.O. At rate of £100.
City of London Hospital for Diseases of the Heart and Lungs, Victoria Park, E.—H.P. At rate of £100.
Connaught Hospital, E.—Hon. Surgeon.
Dewsbury and District General Infirmary.—H.S. £150.
Dewsbury, Infectious Diseases Hospital.—Res. M.O. £200.
Dreadnought Hospital, Greenwich, S.E.—H.P. and H.S. At rate of £110.
Edinburgh Royal Colleg[illegible] Duncannon Fellowship for Medica[illegible]
Evelina Hospital for Sick [illegible] *E.*—H.P. At rate of £120.
Glasgow University.—Muirhead Chair of Medicine.
Gloucester, Gloucestershire Royal Infirmary, &c.—Res. H.P. and Res. H.S. Each at rate of £150.
Golden-square Throat, Nose, and Ear Hospital, W.—Hon. Surgeon. Also Hon. Asst. Surgeon.
Great Yarmouth General Hospital.—H.S. £140.
Hastings, Royal East Sussex Hospital.—Temp. Asst. Pathologist. 7 gns. per week.
Hendon Isolation Hospital.—Res. M.O., &c. £500.
**Hospital for Consumption and Diseases of the Chest, Brompton, S.W.*—Asst. in Pathology Dept. £350.
Hospital for Sick Children, Great Ormond-street, W.C.—H.P. and H.S. Each at rate of £100. Also Physician to Skin Department.
Hull Municipal Maternity Home and Infants' Hospital.—Ju Res. M.O. At rate of £100.
Hull Royal Infirmary.—Third H.S. At rate of £150.
Ilford, King George Hospital.—Cas. O. At rate of £130.
Kent and Canterbury Hospital.—H.S. At rate of £125.
Kingston and District Hospital.—Jun. Res. M.O. At rate £250.
Lancashire C.C., School Medical and Child Welfare Dept.—M. £800.
L.C.C.—Radiologist. £1500.
Leeds Public Dispensary and Hospital.—Hon. Surgeon.
Lincoln County Hospital.—Sen. H.S. At rate of £250.
Liverpool University.—Jun. Lecturer in Pathology Dept. £30
London Hospital, E.—Asst. Director of Med. Unit.
London University.—Chair of Obstetrics and Gynæcology. £200
Manchester Babies Hospital, Burnage-lane, Levenshulme.—Ju Res. M.O. At rate of £50.
Manchester, Christie Hospital and Holt Radium Institute, Will ington.—Res. M.O. At rate of £150.
Manchester Northern Hospital for Women and Children, Par place.—Jun. H.S. £100.
Manchester Royal Children's Hospital.—Asst. Surgeon. £50.
Manchester Royal Eye Hospital.—Jun. H.S. £120.
Northwood, Mount Vernon Hospital.—H.S. £150.
Norwich, Norfolk and Norwich Hospital.—H.P., H.S., and H. to Spec. Depts. Each £120.
Preston County Borough.—Asst. School M.O. £500.
Princess Beatrice Hospital, Earl's-court, S.W.—Clin. Asst. X Ray Dept.
Princess Louise Kensington Hospital for Children, St. Quinti avenue, N. Kensington, W.—H.P., and H.S. Each at ra of £100.
Queen Mary's Hospital for the East End, E.—Cas. O. At ra of £150. Also Two H.S.'s, H.P., Obstet. H.S., Res. Anæ thetist, and H.P. Each at rate of £120.
Queen's Hospital for Children, Hackney, E.—H.P. and Cas. Each at rate of £100.
R.A.M.C.—Commissions.
Rotherham Hospital.—H.P. £180.
Royal Free Hospital, Grays Inn-road, W.C.—Res. Cas. O. rate of £150. Res. Asst. Path. At rate of £75. Also H. for Ear, Nose, and Throat Beds, and Res. Anæsthetist.
Royal London Ophthalmic Hospital, City-road, E.C.—Hon. As Phys.
Royal Waterloo Hospital for Children and Women, Waterloo-roa S.E.—Hon. Clin. Asst.
St. Mark's Hospital for Cancer, &c., City-road, E.C.—Re Surg. O. At rate of £150.
St. Thomas's Hospital, S.E.—Chief Asst. to Dental Dept.
Salvation Army, Mothers' Hospital, Lower Clapton-road, E.— Jun. Res. M.O. At rate of £80.
Sheffield, Jessop Hospital for Women.—Two H.S.'s. Each rate of £100.
Shrewsbury Eye, Ear, and Throat Hospital.—H.S. At rate £225.
Southend-on-Sea General Hospital.—H.S. At rate of £100.
Swansea County Borough, Mental Hospital.—H.P. At rate £100.
West End Hospital for Nervous Diseases, Gloucester Gate, N.W.— Hon. Asst. Radiologist.
Western Ophthalmic Hospital, Marylebone-road, N.W.—Ju Res. H.S. At rate of £100.
West London Hospital, Hammersmith-road, W.—H.P., H.S., an Res. Anæsthetist. Each at rate of £100.
Wolverhampton Royal Hospital.—H.S. for Ear, Throat, an Nose Dept. At rate of £100.
Worksop, Victoria Hospital.—H.S. At rate of £170.
York County Hospital.—Res. Anæsthetist and Asst. H.S. £15

* In our advertisement columns last week (p. 50) the da of the meeting of the Medical Committee of the Hospital f Consumption and Diseases of the Chest was inadvertent announced as June 30th. It is given correctly as June 20 in the advertisement appearing on p. 53 of our present issue.

Births, Marriages, and Deaths

BIRTHS

JOHNSON.—On May 15th, at Linden House, Romsey, Hants the wife of Dr. G. H. Johnson, of a son.

MARRIAGES

NEALE—SHARP.—On May 15th, at All Souls Church, Langham place, London, Albert Ezra Neale, M.D., of *Holland Park* to Vivien Irene, widow of Harold Sharp, of Northgate Warwick.

DEATHS

BARRS.—On May 12th at Wanstead, E.11, John Harry Barr F.R.C.S.I., Senior Surgeon of Connaught Hospita Walthamstow, in his sixty-ninth year.

BUCKLEY.—On May 15th, at Grosvenor-mansions, Buxton George Granville Buckley, M.D., late of Bury, aged 56.

SUTCLIFFE.—On May 9th, at Hill House, Tywardreath, Willia Sutcliffe, M.R.C.S., L.R.C.P. Lond.

TAYLOR.—On May 15th, at Park-circus, Glasgow, after a lon illness, James Taylor, F.R.C.S. Edin.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices Births, Marriages, and Deaths.

NOTES, COMMENTS, AND ABSTRACTS

LEFT-HANDEDNESS

SOME OF ITS ASSOCIATIONS

BY CHARLES J. MACALISTER, M.D. Edin., F.R.C.P. Lond.

CONSULTING PHYSICIAN TO THE LIVERPOOL ROYAL SOUTHERN HOSPITAL AND TO THE ROYAL LIVERPOOL CHILDREN'S HOSPITAL

IN 1642 Sir Thomas Browne discussing in his Religio Medici the doubts which have been cast upon certain Biblical statements by various authors confesses that he has perused them all and can discover nothing that may startle a discreet belief. Among these he says: "Whether Eve was framed out of the left side of Adam I dispute not because I stand not yet assured which is the right side of a man and whether there be any such distinction in nature." By far the largest number of left-handed people are perfectly normal physiologically, but there are abnormalities depending upon transposed, or to speak more correctly, imperfectly transposed function.

So far as we know all the lower animals are ambidextrous, and it is interesting to note that children up to the age of about two years also appear to use either hand indiscriminately. This is so marked that mothers get into the way of correcting their children by making them use the right hand when they manipulate with the left one, this educative factor being one of the popular explanations of the perpetuation of right-handedness.

The Origins of Right-handedness

That right-handedness is hereditary there can be no doubt, but how that characteristic was originally acquired is very difficult to explain, and as in the case of all unexplained problems, the number of theories which have been advanced is very considerable. I need not enumerate all of these, and many of them are far fetched and fantastic. One of the most popular arose from the impression of early man that in mortal combat wounds of the left chest were liable to be more fatal than those of the right, giving rise to the protection of the left side by a shield on the left arm, the right one thus becoming developed as a sword-arm.

Various observers have indicated that the left side of the brain develops somewhat earlier than the right one, and that the right side of the body therefore becomes earlier and more emphatically used owing to a greater supply of nerve force to its muscles, and that corresponding with this would come the earlier specialisation of the speech motor apparatus in the left Brocal convolutions.

Another suggestion put forward in the past was that the trend towards dextrality synchronised more or less with the development of writing by signs, and that it is just possible that a sign language preceded a spoken one. In this connexion it is interesting to remember that the natural sign language of the deaf and dumb must date from very ancient times. The real interest in it depends on its universality, a fact which was noted by George Dalgarno, an Aberdonian, who was headmaster of Elizabeth School, Guernsey, and later for many years at Oxford. Dalgarno in 1664 suggested that advantage should be taken of this fact to utilise it as a universal language, and he wrote a book on the subject entitled "Ars Signorum Vulgo Character Universalis."

Whatsoever the explanations of right- or left-handedness may be in the processes of evolution, there can be no doubt that they are hereditary; the great dominance of the inheritance being a right-handed one, and the distinctive features of this have led to each hand having its peculiar functions. The use of the knife in the right hand and the fork in the left one illustrates this, and also the specialised functions of the right and left hands in playing the violin, for instance, and other bimanual requirements. Notwithstanding this, the idea still exists that everybody ought to be ambidexter, or capable of being educated to be so, and on this basis the Ambidextral Culture Society was constituted. Its members believe that man, having originally been ambidextrous, and there being no anatomical or physiological reason for his being otherwise, one-handedness was simply an acquirement capable of being balanced and corrected. At one time, within my own recollection, this society was very active, but our knowledge of the functions of the brain, and more especially of the unilateral situation of the speech centre, has led to a dismissal of the suggestion that equi-handedness or equi-brainedness will ever become re-established, if it ever existed.

The Dominance of Right-handedness

All nations without exception have a dominance of right-handedness. Of the relative frequency of left-handedness in various nations I have no statistics, but in our own country the proportion ranges from 5 per cent. to 8 per cent., and there is reason for believing that in small communities it may be somewhat higher owing to the intermarriage of the people. Dr. W.W. Ireland in "Brain," 1880-81, vol. iii., p. 207, recorded some figures obtained from a teacher of the Sessional School at Larbert, where Ireland was superintendent from 1869 to 1879 of the Scottish National Institution for Imbecile Children. He estimated that among normal children in his district about 12 per cent. were left-handed. This is a much higher figure than maintains in the Liverpool council schools, in which I investigated the matter in 1920, and is probably related to the parochial population of a small place like Larbert where hereditary characteristics would tend to be amplified.

I recollect to have discussed with the late Prof. Thomas Glynn the reputed prevalence of left-handedness among criminals. I am not convinced that this has ever been confirmed, but in an article by C. Lombroso, in the *North American Review*, vol. v., p. 440, on left-handedness he stated that the percentage in this class was much higher than that in the normal population—viz., 13 per cent. among men and 22 per cent. in women, as compared with the 7 per cent. in men and 5 per cent. to 8 per cent. in women, in a total of 1029 normal members of society. However this may be, we certainly cannot infer from experience that the majority of left-handed people have a wicked strain in them, though it is interesting to recollect that the conventional use of the word "sinister" originated from a reputed association of the kind, and Lombroso mentioned that the people of Lombardy and Tuscany speak of an untrustworthy person as being left-handed. When left-handedness is inherited there can be no doubt that the large preponderance of right-handed people renders it extremely unlikely that the production of a pure left-handed strain is probable. An outcrop of left-handedness in a family is probably Mendelian in origin, owing to the union of hybrid individuals both having, say, a dominant right-handed inheritance with a repressed left-handed one. Where a definitely left-handed individual marries a right-handed hybrid possessing a repressed left-handed strain, the likelihood of there being left-handed progeny would of course be amplified.

Left-handedness and Transposition of the Viscera

It might be thought that complete transposition of the viscera would in every case be associated with a right-sided speech centre, but curiously this is not the case, there being a good many records of this condition where there has been right-handedness, although the majority of them have been left-handed.

M. Cachet, quoted by Pye-Smith in Guy's Hospital Reports, 1870, describes a case of transposition in a young woman who was right-handed during life; another case was recorded by M. Gery, and a third by Dr. B. S. Schultz; and in a case of a complete transposition recorded by Pye-Smith himself he had ascertained that the subject of the abnormality had been right-handed during life. These cases of course would be the equivalents of left-handedness in normal individuals. But left-handed people in a certain number of cases have undoubtedly left-sided speech centres, it being apparently unnecessary to have the speech centres transposed, although the dominant motor centres for the arm and leg are in the right hemisphere. This has been adverted to by many clinical observers who have commented on the fact that, in the majority of cases where left-handed people are the subject of apoplexy, giving rise to left hemiplegia, there is accompanying aphasia; and there have been instances where the hæmorrhage has been shown to involve the speech motor area in the right brain without interference with speech, thereby indicating that the speech centre had not been transposed. Bearing upon this there was an important paper in the *American Journal of Medical Sciences*,[1] written by Dr. Foster Kennedy, which deals with the causation of aphasia. This was a criticism of a paper by Pierre Marie and his colleague Moutier, written in 1908: "La théorie de la gaucherie cérébrale, pleine d'obscurities, contradite par les faits, ne peut servir à expliquer pour les partisans du centre de Broca les destructions de ce centre sans aphasie." This conviction arose from the circumstance that notwithstanding the indubitable evidence that in right-handed persons the speech centre is in the left Broca's area, there are certainly cases freely cited by Moutier of "right-handed right hemiplegics without aphasia, and also cases of left-handed left hemiplegics without any disturbance of their powers of conversation." The author's comment is that "these cases only impugn the theory of constant conjunction in any one subject of right-brainedness and left-handedness, or of left-brainedness and right-handedness." He suggests that the simple statement that a patient is right-handed is not adequate in some of the cases which he recalls, and he lays stress upon the necessity for investigating the question not only of a patient's handedness, but also of the prevailing type of handedness in his stock, which, as he states, throws some light on a very obscure chapter of neurological medicine. I freely quote his observations on this point:

His *first* case was one of a massive bomb injury to the right speech area and occipital lobes in a left-handed man without left-handed relatives or ancestry, and there was no aphasia. He never had any difficulty with speech. He was a man who was left-handed to an extreme degree. He reversed the usual position of the knife and fork, and, while he wrote with the right hand, he was equally able to do so with the left. The injury sustained was extensive, and with X rays the fragments of the grenade and of the driven bone were seen to have been flung through the cortex and embedded in the right occipital pole; if the speech centre had been in its normal position there should have been distinct disorder of that function.

His *second* case was one of a left-handed man, aged 36, suffering from embolic right-sided paralysis and aphasia, showing that the speech centre was in the left hemisphere. None of his near relatives or ancestors was known to be left-handed. Kennedy pointed to the fact that he was isolated as a left-handed person in a stock entirely right-handed.

A *third* case quoted was a completely left-handed man who had sustained a fracture involving the right speech area, with right middle meningeal hæmorrhage. Craniectomy had been performed, a bone injury of two by four inches having been made over the affected areas. There had been left hemiplegia which had recovered, but he occasionally suffered from severe left-sided convulsions. Despite his left-handedness, which was complete, except for writing, there had never been the slightest interference with the function of speech. This patient's relatives were all right-handed. He had lived, as had the first case recorded, as a member of a village community, in which in both instances were included many of their relatives. Each man was quite positive that he was the only left-handed member of the stock.

Another series of cases recorded by Kennedy is of right-handed individuals showing similar peculiar results from similar cerebral catastrophes. For instance, a right-handed girl suffering from severe Jacksonian convulsions confined to the left side of the body always followed by severe transient left hemiplegia with equally severe transient aphasia. The patient, herself right-handed, had a left-handed father and a left-handed mother. Another case was a young man suffering from right-sided subcortical Rolandic glioma, for which was performed a right subtemporal decompression. He had complete aphasia for ten days following the operation. He himself was right-handed, but he had two brothers both of whom were left-handed. Another case was that of a woman, aged 67, suffering from a cerebral hæmorrhage resulting in left hemiplegia and a considerable degree of sensory motor aphasia. She was right-handed, but her mother had been left-handed. She had a left-handed brother and a left-handed daughter.

Stammering

Bearing in mind these anatomical and physiological facts, and the Mendelian explanation of inherited left-handedness, I think we may be in a position to throw some light on the explanation of stammering, and some other conditions of muscular incoördination which have dawned as the outcome of clinical experience. The stammering associated with left-handedness has been the subject of recent correspondence in the lay press. Looking back one can recollect a considerable number of instances where this defect of speech has been transmitted by inheritance, sometimes in right-handed people as well as left-handed ones. In the former probably it is the result of a repressed left-handed strain, and in the latter of a repressed right-handed one, and in this connexion a study of the transposition of the speech centres in left-handed people is significant.

Right-handedness or left-handedness must be regarded as a kind of inherited physiological incoordination of function in which some specialisation has been acquired by one cerebral hemisphere as compared with the other, and it is from a study of such specialisation that we must try to elucidate the upsets which result in stammering and some other gross muscular ataxias. Hughlings Jackson in his writings on the speech centres directed attention to the very interesting barrel-organ expressions commonly observed in cases of aphasic hemiplegics, and he pointed out that these utterances often refer to the thought or verbal expression of the patient at the very commencement of the hæmorrhage. He instanced a case of a railway signalman who was struck down by an apoplexy when walking from his signal-box to the railway platform, along a line on which he knew that a train would presently pass. From the time of his stroke, although aphasic, he repeated over and over again the words, "I want protection." In my own experience a friend who was suddenly overwhelmed with an apoplexy of the left brain repeated over and over again the words, "I want some brandy," almost until the time of his death. These kinds of expressions, according to Hughlings Jackson, represent the last call of the patient before the destruction or putting out of action of the speech centre in the left Broca area. He advanced the explanation that although speech is initiated in the left centre, the corresponding centre in the right brain acts as an automatic one which, having picked up the message from its neighbour, pours it forth in the barrel-organ way described. Hughlings Jackson, from these observations, styled the left speech centre as the leading one and the right as an automatic one.

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[1] Stock Brainedness, the Causative Factor in the So-called "Crossed Aphasias." Foster Kennedy, M.D., F.R.S. Edin., Amer. Jour. Med. Sci., 1916, p. 823.

May not all this throw some light on the relative functions of the two centres and help us in our explanation of stammering and some other grosser abnormalities? May not stammering of this type be due to an imperfect transposition of function in the centres of the two sides of the brain? If so, one can imagine that in a left-handed stammerer whose leading speech centre would be in the right brain there may be a recessed leading centre in the left brain, and also perhaps some imperfect transposition of the automatic centres, and that the stammering might result from a confusion of function on the two sides.

Cases of Congenital Aphasia

Bearing on this come those interesting cases of congenital aphasia, unassociated with any deafness, of which three have been under my personal observation. The *first* of these was a big well-developed girl of 13 who had never spoken properly, who was practically aphasic. At 3 years of age she was thought to say "Mama" and "Dada," and subsequently learned to say a few words imperfectly, but her real language was almost entirely composed of signs and gesticulations similar to those natural ones used by the deaf. She was an absolutely left-handed child of right-handed parents, but her maternal grandfather was left-handed. When she was developing, the left breast developed considerably before the right one. She was quite intelligent and had a wonderful memory. It was evident that she could not use her speech centres, and one speculates as to whether this marked incoördination was not related in some way to the right centre being unbalanced by some unusual development of function of the left one, thus giving rise to confusion of coördination. The *second* case was a child of 6 who, although aphasic, was absolutely bright and quite up to the standard of intelligence for her age; she was also left-handed and presented a collateral sinistral history. Although unable to speak she could hum tunes and try to sing without words. The *third* case was a boy, aged about 3, who had never spoken. He was right-handed, but came of a distinctly left-handed stock on the maternal side; the mother's brother and sister and his mother all being left-handed.

Fright Choreas: Epilepsy

I have had several cases of left-handed children who only began to stammer when an attempt was made to convert them into right-hand writers owing to confusion of the right and left centres. This leads me to mention another very interesting series of cases which, although clinically choreas, really represent a gross muscular ataxia. I refer to the so-called fright choreas. In looking over my records I find that I have notes of cases, of which 13 were right-handed, 15 left-handed, and 5 were markedly ambidexters. Every one of these cases presented an ancestral history of left-handedness. That is to say, that the tendency towards left-handedness in the case of the right-handed, and towards right-handedness in the case of the left-handed children. led to confusion of coördination resulting from partial or repressed transposition of the cerebral function; this had given no trouble until the upsetting of the balance had been brought about by fright or emotional causes. It is on these lines that I venture to suggest that we have the explanation of stammering, in its relation to left-handedness. There are, of course, types of stammering due to functional causes, unassociated with any history of left-handedness. These must not be confused with the cases to which I have referred.[2]

Physiological incoördination appertaining to handedness refers not only to the general motor system, but it has another curious association. There is normally a strong side and a weak side to the body, and this does not apply only to physical strength and dexterity, for it has a bearing upon vitality and upon susceptibility to disease. In a paper on Education and Coördination of Function[3] I pointed out that most deformities, such as club-foot and other malformations, are on the weaker left side, and so are a number of acquired diseases. I have over and over again demonstrated the fact that in right-handed children chronic fibroid bronchiectasis is almost invariably initiated on the left side, whereas its position is reversed when the patient is left-handed. At a meeting of the Association of Physicians of Great Britain and Ireland some years ago during a demonstration of a case of right-sided bronchiectasis, I remarked to the demonstrator, "Surely this boy must be left-handed, for I have seldom seen such a one in an ordinary right-handed person," and my conjecture turned out perfectly correct.

Ireland, whom I have already quoted, says left-handedness is not only common in epilepsy, but it is also more pronounced in this disease than in any other form of mental affliction, and Trousseau has remarked ("Clinical Medicine," Paris, 1868, vol. ii., p. 668), that the right and left sides are subject to different diseases; neuralgia, for instance, is more common on the left side of the chest than the right, and I have noted that chilblains and atrophy of the nails in cold weather are often more marked on the left hands than on the right. Wherefore this selective tendency for disease to attack the left side? It must be related to the greater vitality and strength of the right side. It has been suggested that the stronger right side is brought about by its having a more direct blood-supply than the left, but it is to be remembered that the supply to the right side of the brain is also more direct than it is to the left side, which rather annuls that theory. I have no explanation to offer unless it be that a lesser resistance on the weaker side has to do with the matter.

Conclusion

In conclusion I may just refer to some of the physical characteristics of left-handedness which are sometimes quite obvious. There is a degree of asymmetry, or, as it is often termed, hemiatrophia, in most people, the right side of the face and the right chest being rather more developed corresponding with the greater size and strength of the limbs. This muscular predominance is further observable in facial expression, the stronger side often acting a little more quickly or emphatically than the weaker, so that during smiling the angle of the mouth gets more elevated on the one side than on the other, and one eyebrow perhaps raises a little more than its neighbour. This asymmetry, together with the slightly larger orbit which is occasionally observable due to greater muscular tonicity, is not without its attractiveness. It gives rise to archness of expression which is a point in beauty. These characteristics are all transposed in the left-handed. Occasionally there is a greater growth of hair on the trunk of sinistral people on the left than on the right side, and regarding the hair of the head, it is sometimes easy to spot a left-hander because he parts his hair on the right and brushes it over to the left. When examining recruits during the war I frequently observed that, whereas the left testicle is the lower in a right-handed man, it is the higher in a left-handed one.

The subject of left-handedness and of the various conditions associated with it have interested me for many years, and the substance of this paper has been referred to in clinical and post-graduate lectures on several occasions.

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[2] These cases and clinical experiences were referred to at a meeting of the Association of Physicians of Great Britain and Ireland at Edinburgh in 1923, and in an article on a Classification of Chorea in Relation to its Causes, Brit. Med. Jour., Nov. 8th, 1924.

[3] Some Relationships between Education and Coördination of Function. Presidential Address to Liverpool Biological Society, 1914. Transactions, 1914, vol. xxviii.

THE LA TOJA SPA

THE island of La Toja, off the north coast of Spain, is well known for its copious hot salt springs (140° F.), which are used internally and externally for a variety of complaints. The water, besides the chlorides of sodium, calcium, and magnesium, contains a large proportion of iron and some bromide, arsenic, and silicates. Its composition makes it suitable for catarrhal dyspepsia and constipation and obesity, whilst the baths and natural muds are advised for chronic rheumatic, inflammatory, and exudative diseases of various kinds.

The opening of an installation in connexion with this spa at Sunderland House, Curzon-street, London, was announced recently in our columns. A visit to the installation by a specialist in spa therapeutics has resulted in the following note: "The natural salts and salt muds have been extracted from the source. The salts are prescribed internally in appropriate doses and for nasal douches, gargles, and inhalations. The baths are prepared from the salt iron mud and given usually with massage principally for rheumatic and skin affections. The effect is pleasant and stimulating to the skin and circulation. A medicinal soap and ointment have also been prepared from the La Toja waters, as well as a variety of toilet preparations. Whilst it cannot be expected that these preparations can reproduce the effects of the water in the fresh state, the baths should be of definite medical value in appropriate cases."

SANATORIUMS AND PUBLIC-HOUSES

THE report for 1933 of the Aargau group of sanatoriums makes it clear that the public-house is regarded in Switzerland as an inconvenient neighbour to a sanatorium. Previous reports have discussed the difficulties and their possible solution, and this report states that the governing body of the canton of Solothurn by resolution deprived the mountain inn Saalhöhe of its licence from Jan. 31st last because the licensee had not fulfilled an instruction to refrain from serving the sanatorium patients. It was left open to the licensee to carry on as a coffee-house from Feb. 1st, but even this permission is to be withdrawn should he continue to serve customers who can be recognised as sanatorium patients. Similarly, the inns Balmis and Barmel, which retain their licence, have to undertake not to serve sanatorium patients recognisable as such. The canton has refused an application for a licence to an inn at Breitmies. Their attitude to this question is not guided simply by regard for the sanatorium patients, but also for the other guests from the use of the same glass and crockery, the danger of infection not being met by the usual washing-up, unless supplemented by formal disinfection.

WHITFIELD STREET MOTHERS' CLINIC

Lord Moynihan has put his name to the first public appeal ever made on behalf of the Mothers' Clinic in Whitfield Street, Tottenham Court-road, London. First opened in Spring 1921, over 20,000 women have attended, and affiliated clinics are at work so far away as South Africa. Medical practitioners of many nationalities have visited the clinic and shown their appreciation of the teaching demonstrations given there.

EMPLOYMENT OF SURPLUS MILK.—Mr. JOHN CAMPBELL, Ph.D., writes to advocate the use of some of the surplus milk in bread-making. In Germany, he says, bakers are obliged to add at least 5 per cent. of milk to the dough, and in the U.S.A. and Canada powdered milk is used largely for the same purpose. Dr. Campbell does not suggest that the use of milk in bread-making could possibly replace the consumption of whole liquid milk in the school dietary, but he does think that in a pressing agricultural problem of this kind all possible fields of absorption should be exploited. The addition to white bread of milk even in small proportion would secure a proportion of high-quality proteins and phosphates at every meal and on every day.

Medical Diary

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MONDAY, May 28th.

Odontology. 8 P.M. Annual General Meeting at the Royal College of Surgeons, Lincoln's Inn-fields, W.C. Sir Frank Colyer will show specimens received in the Museum during the past year.

TUESDAY.

Pathology. 8 P.M. Summer Meeting at Mill Hill. Imperial Cancer Research Fund, Stroud Laboratory: Demonstrations by W. Cramer, L. Foulds, E. S. Horning, R. J. Ludford, E. Vazquez-Lopez (Madrid), A. F. Watson, and A. F. Watson and M. Mitols. National Institute for Medical Research, Rhodes Farm: Demonstrations by G. W. Dunkin, J. McIntosh, and W. E. Gye and W. J. Purdy.

FRIDAY, June 1st.

Radiology. 7 P.M. Annual General Meeting.

BRITISH INSTITUTE OF RADIOLOGY, 32, Welbeck-street, W.

THURSDAY, May 31st.—8 P.M., Annual General Meeting. Mr. H. A. Edgerton: Measurement of X Ray Quality by a Photographic Method. Mr. A. J. Minns: The Technical Aspects of Short Wave Therapy.

FRIDAY, June 1st.—Medical Meeting. 11 A.M., Visit to Cancer Hospital, Fulham-road, S.W. 5 P.M., Discussion of Cases. Dr. J. V. Sparks will give a short communication on Radiographic Demonstration of Calcification in Cardiac Valves.

A series of paper films by Dr. Sparks, with special reference to chest cases, will be on view at the B.I.R. on Thursday and Friday.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY, May 28th, to SUNDAY, June 3rd.—MAUDSLEY HOSPITAL, Denmark-hill, S.E. Course in Psychological Medicine; afternoons.—ST. JOHN'S HOSPITAL, Leicester-square, W.C. Course in Dermatology; afternoons.—CITY OF LONDON HOSPITAL, Victoria Park, E. Course in Chest Diseases; all day.—CHELSEA HOSPITAL FOR WOMEN, Arthur-street, S.W. Course in Gynæcology; all day.—LONDON LOCK HOSPITAL; 91, Dean-street, W. Course in Venereal Disease. afternoons.—ST. MARY'S HOSPITAL, Plaistow, E. Week-end Course in Medicine and Surgery; all day, Sat. and Sund.—MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W. Lecture on Functional Heart Disease, at 2.30 P.M. on Tues., by Dr. A. E. Clark-Kennedy.—LECTURE HALL, Manson House, 26, Portland-place, W. Debate on the motion "that in the absence of complications surgical interference in cases of gastric and duodenal ulcer is unnecessary." Principal speakers: Dr. A. F. Hurst and Mr. Mortimer Woolf for the motion, and Dr. Robert Hutchison and Mr. Herbert Paterson against the motion. Lord Moynihan of Leeds will take the chair. Wed., 8.30 P.M. (Open to all members of the medical profession.)

KING'S COLLEGE HOSPITAL, Denmark Hill, S.E.

THURSDAY, May 31st.—4.30 P.M., Dr. Allen Daley: Public Agencies which exist for the Prevention of Disease.

ST. PAUL'S HOSPITAL, Endell-street, W.C.

WEDNESDAY, May 30th.—4.30 P.M., Dr. T. Jenner Hoskin: The Cardiac Factor in the Choice of Anæsthetics.

LONDON SCHOOL OF DERMATOLOGY, St. John's Hospital, 49, Leicester-square, W.C.

MONDAY, May 28th.—5 P.M., Dr. M. Sydney Thomson: Common Skin Diseases in Childhood.

WEDNESDAY.—5 P.M., Dr. J. A. Drake: Animal Parasites.

THURSDAY.—5 P.M., Dr. A. C. Roxburgh: Differential Diagnosis of some Common Skin Diseases.

ST. MARY'S HOSPITAL INSTITUTE OF PATHOLOGY AND RESEARCH, Paddington, W.

THURSDAY, May 31st.—5 P.M., Dr. Leonard Colebrook: Control of Streptococcus Pyogenes Infections.

CHADWICK PUBLIC LECTURES.

TUESDAY, May 29th.—5.30 P.M. (at the Royal United Service Institution, Whitehall, S.W.), Dr. J. B. Orr: National Food-supply and Public Health.

UNIVERSITY OF BIRMINGHAM.

TUESDAY, May 29th.—3.30 to 5 P.M. (at the General Hospital), Prof. *K. Douglas Wilkinson*: Use of Hypnotics.

FRIDAY, June 1st.—3.30 to 5 P.M., Dr. C. C. W. Maguire: Manifestations and Treatment of Arterio-sclerosis.

LEEDS GENERAL INFIRMARY.

TUESDAY, May 29th.—3.30 P.M., Mr. Broomhead: Backache.

GLASGOW POST-GRADUATE LECTURES.

WEDNESDAY, May 30th.—1.15 P.M. (at the Eye Infirmary), Dr. J. Marshall and Dr. J. B. Stewart: Eye Cases.

ADDRESSES AND ORIGINAL ARTICLES

THE RÔLE OF THE LIVER IN THE METABOLISM OF CARBOHYDRATE AND FAT*

By C. H. Best, M.D., D.Sc. Lond.,
F.R.C.P. Canada
PROFESSOR OF PHYSIOLOGY IN THE UNIVERSITY OF TORONTO

I.—METHODS OF APPROACH TO THE PROBLEM

A TIME-HONOURED and very useful method of approach to a physiological problem such as that which I will discuss to-day is to remove the organ in question and to investigate the metabolic processes in the preparation thus produced.

In 1886 Minkowski removed the liver from geese, which are conveniently constructed for this operation, since the renal-portal vein anastomosing with the inferior vena cava by means of the circle of Jacobson provides a passage for the return of blood from the alimentary tract after the portal vein has been ligated. The liver can be removed without damaging the vena cava. It was soon realised, however, that certain metabolic changes in these birds are quite different from those of mammals, and the need for study of dehepatised mammals became even more apparent. The Eck fistula was introduced by the Russian surgeon whose name we associate with this procedure. The technique was popularised by Pavlov, and in his hands yielded very useful results in a field outside our immediate interest. The creation of this fistula is, of course, one of the essential steps in some of the techniques now used. The development of the modern method for complete removal of the liver is due very largely to F. C. Mann and his pupils. Some useful modifications of Mann's three-stage procedure have been introduced. We now prefer the single-stage operation recently described by Markowitz and Yater, who were for some time Mann's pupils, which utilises a number of steps introduced by various previous investigators. Completely dehepatised dogs have been and still are extremely useful in studies of carbohydrate and fat metabolism in which an unanæsthetised liverless preparation with central nervous system and pancreas intact is desired.

A large proportion of the information gained up to the present has been secured in animals dehepatised by Mann's three-stage operation. The problem in complete hepatectomy is the return of the portal blood, and that which normally flows through the hepatic portion of the vena cava, to the heart. The liver cannot be removed from mammals without including this portion of the vena cava. In Mann's method an artificial "caput medusæ," or pattern of collateral veins such as that seen on the abdomen in cases of chronic portal obstruction, is produced by gradually creating an impediment to the return of blood through the vena cava and portal vein. His first step is to make a reverse Eck fistula and to force caval blood through the liver by ligating the vena cava. An increased venous pressure is built up and anastomotic channels expand and carry much of the load. Some of these vessels are visible on the abdomen, but a large part of the blood may pass by way of the deep lumbar and azygos veins. Some six weeks later the portal vein is tied off and still further enlargement of the collaterals is produced. Hepatectomy may be performed at any subsequent time. This consists merely of ligating (1) the structures in the gastro-hepatic omentum, and (2) the sub-diaphragmatic vena cava. The liver can then be easily removed. The creation of the Eck fistula is the only difficult part of this operation. Markowitz and Soskin, working in Toronto, partially occluded the portal vein and vena cava by linen ligatures at one operation, and subsequently, after the collateral circulation had developed, obstructed these vessels completely and removed the liver. This two-stage method has provided useful preparations in the hands of many of us and enables hepatectomy to be performed in various small animals (cats, rabbits, guinea-pigs) in which the establishment of an Eck fistula is not practicable. In 1929 Firor and Stinson [1] described a one-stage operation for removing the liver. The vena cava was cannulated below the liver and the portal vein and cava were joined by a Y-shaped pyrex glass cannula below the caval cannula. These investigators introduced this very useful procedure of substituting a hard glass cannula of wide bore for the hepatic vena cava. There is no clotting in the cannula, and this procedure apparently introduces no new difficulties. One would, of course, prefer not to use this cannula if studies in the rate of clotting, &c., were being made in the dehepatised animal. Markowitz, Yater, and Burrows [2] utilise this pyrex glass cannula in their method which, in so far as my personal experience with it goes, offers an excellent means of obtaining completely dehepatised dogs for physiological studies. The blood loss and interference with the circulation are less than in the other procedures. I will attempt to describe this technique in as few words as possible.

The first step after the abdomen is opened is to expose the vena cava and portal vein by collecting the intestines in a fold of the duodenal mesentery which is then drawn to the animal's left side. The inferior vena cava is freed from its attachment at a point just below where it becomes buried in the liver. A stout ligature is tied around the cava and over a small brass rod, the function of which is to protect the vessel when this ligature is cut. The glass cannula is then inserted and secured. The occluded vena cava is then released. This very simple step is useful for complete removal of the liver in eviscerated preparations. The next step is to prepare the Eck fistula. This is a most interesting technique which in its present form is due in large part to Fischler and Schröder. The idea is to create a water-tight casement surrounding a cutting suture. The first row of sutures is laid and the cutting thread introduced, and the two vessels are sewn together over the line of the cutting thread by a second row of sutures. One then grasps the two ends of the cutting thread and saws through the adjoining walls of the two vessels. There is usually little or no hæmorrhage. The structures in the gastro-hepatic omentum are ligated and several ligatures are tied around the vena cava and the cannula above the liver. The liver is then removed in one piece.

Carbohydrate Metabolism in Dehepatised Animals

The dehepatised animals make a rapid recovery from the operation, and within an hour of the placing of the last suture they may run about and respond to call. At the end of the second hour, however, they are much less alert. The muscles may twitch. There may be generalised convulsions, coma, and death. This is the picture described by Mann and Magath and associated by them with hypoglycæmia. Incidentally, this description furnished the clue to the cause of the effects of an overdose of insulin. The improvement in the condition of these dehepatised animals brought about by the administration of sugar was the first convincing demonstration that

consciousness, the well-being and life of a mammal, depends on the maintenance of a certain tension of sugar in the blood. Bock and Hoffmann, and Pavy and Siau, had noted hypoglycæmia in anæsthetised dehepatised preparations, and numerous other observers found this to occur when the pancreas had also been extirpated (see Macleod, 1926).[3]

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* Three lectures delivered for the University of London at University College on Jan. 11th, 15th, and 18th. Lectures II. and III. will appear in forthcoming issues.

The amount of dextrose necessary to maintain these animals in good condition varies somewhat, but the rate of injection should be such as to provide approximately one-quarter of a gramme per kilogramme per hour. If the liverless animal is exercised Mann and Magath found that the sugar requirement is considerably greater. Dehepatised, depancreatised dogs have also been found by Yater, Markowitz, and Cahoon to require large amounts of sugar. In general they need somewhat less than animals with the pancreas intact. Sugars other than dextrose are relatively ineffective, but I will not discuss this subject in detail.

These experimental results provide excellent evidence that one of the important functions of the liver is to manufacture sugar. In the absence of the liver, no means exist by which the concentration of the sugar of the blood can be raised other than by giving sugar. We know, of course, from Corkill's extension of Cori's work, that muscle glycogen may be broken down by adrenaline in functionally dehepatised animals, but the lactic acid formed is not changed into dextrose which is available to replenish the blood-sugar. It is well established that insulin accelerates the fall in blood-sugar in these preparations, but a discussion of that field is perhaps only on the fringe of my subject. It is dangerous to attribute the decreased susceptibility to insulin which is exhibited by these dehepatised animals (Markowitz, Mann, and Bollman) to any one factor, since so many metabolic disturbances have been produced. Himsworth's stimulating and closely reasoned argument in favour of the existence of an "insulin-kinase" merits serious consideration, but since there is as yet no direct evidence for the presence of this material in tissues a further discussion of the points he has raised is unnecessary. My reason for mentioning this work here is that the facts at present available have led Himsworth to suggest that this hypothetical "insulin-kinase" may be made in the liver.

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Blood-sugar ..		0·35	..	..	0·57	0·84	..	0·09	..
Muscle	Sugar ..	..	0·09	..	1·45	6·25	..	0·22	..
	Glycogen .	7·11	..	13·57	..	0·37	..	6·32	..
	Lactic acid	0·80	..	..	0·08	0	0	..	0·09
Skin sugar ..		0·25	..	..	1·83	0·77	..	..	0·20
Liver	Sugar ..	0	0	0·11	..	..	..	..	0·11
	Glycogen .	..	0·46	..	1·20	R.	..	..	0·56
Totals		12·39	12·27	18·19	17·46	11·86	12·15	11·20	12·84
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TABLE II.—*Spontaneous Hypoglycæmia or Increased Susceptibility to Insulin*

HYPERINSULINISM (Hyperactivity or tumour of islands of Langerhans)	INTERFERENCE WITH GLUCONEOGENESIS IN LIVER	HYPOFUNCTION OF ANTERIOR PITUITARY, ADRENALS, OR THYROID
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Other causes of hypoglycæmia.—Excessive utilisation of sugar by muscles (dogs in treadmill, marathon runners). Exhaustion of carbohydrate reserves by thyroid feeding (with possibly also hyperactivity of islands of Langerhans) or, in some species, by fasting.

Spontaneous Hypoglycæmia

I may perhaps be allowed to interrupt this description of methods by referring briefly to the interesting subject of spontaneous hypoglycæmia. The rate of sugar production by the liver is the central factor in this problem. Under certain circumstances hypoglycæmia may be due to excessive utilisation of dextrose (prolonged muscular exercise) but is usually produced by a diminished rate of discharge of sugar from the hepatic vein. The three main factors in the production of this effect appear to be (1) damage to the liver cells, (2) excessive inhibition of gluconeogenesis by insulin, and (3) decreased gluconeogenesis attributable to hypofunction of the anterior pituitary, adrenals, or thyroid. I have listed under three headings some of the causes of experimental and clinical hypoglycæmia (Table II.). Direct interference with sugar formation in the liver quite appropriately occupies the central position. Some of the conditions which may produce this effect by damage to the liver cells have been listed, but no attempt has been made to make this list complete. A complete survey of this aspect of the subject has not to my knowledge been made. When there is no damage to liver cells, hypoglycæmia may be observed as a result of an excess of insulin, or, on the other hand, it may be produced by a subnormal activity of the anterior pituitary, the adrenals, or the thyroid. This question will be discussed from another point of view in the next lecture, but it is well established that removal of the anterior pituitary may result in hypoglycæmia (toads, dogs, and rabbits), that removal of the adrenal medulla increases the sensitivity of the animal to insulin, and that in some species hypoglycæmia attributable to adrenal cortex insufficiency is observed. The increased effect of insulin in thyroidectomised animals is also, of course, well known. Clinical counterparts of these experimentally produced conditions are also available. The evidence which is very rapidly accumulating suggests that the anterior pituitary is capable of exerting by direct action on the liver a greater effect on new formation of sugar than these other glands, and it may follow from this that hypofunction of this gland more frequently results in decreased sugar formation and hypoglycæmia. It will be obvious from this short discussion that spontaneous hypoglycæmia may be produced without there being any evidence of excessive insulin liberation from the pancreas. While it is possible for the clinician to determine in most cases whether or not the liver is severely damaged, and also to identify cases in which there is extensive involvement of the adrenals or thyroids, it is quite likely that hypofunction of the anterior pituitary might escape attention. It would be preferable to reserve the term "hyperinsulinism" for cases in which tumours of the islands of Langerhans or extensive hyperplasia and hypertrophy of these glands has been demonstrated (Harris [5]). As will be seen from Table III., which Dr. C. Aberhart has been good enough to prepare for me, in nearly half the cases of spontaneous hypoglycæmia in which an operation has been performed, no lesion of the pancreas (or

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Glucose oxidised ..	3·88	..	4·51	..	3·63	..	4·57	..
Blood-sugar ..	0·35	..	..	0·57	0·84	..	0·09	..
Muscle: Sugar ..	..	0·09	..	1·45	6·25	..	0·22	..
Muscle: Glycogen .	7·11	..	13·57	..	0·37	..	6·32	..
Muscle: Lactic acid	0·80	..	..	0·08	0	0	..	0·09
Skin sugar ..	0·25	..	..	1·83	0·77	..	..	0·20
Liver: Sugar ..	0	0	0·11	..	..	..	..	0·11
Liver: Glycogen .	..	0·40	..	1·20	R.	..	..	0·56
Totals	12·39	12·27	18·19	17·46	11·86	12·15	11·20	12·84
Differences ..	0·12 over.	..	0·73 over.	..	..	0·29 under.	..	1·64 under.

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consciousness, the well-being and life of a mammal, depends on the maintenance of a certain tension of sugar in the blood. Bock and Hoffmann, and Pavy and Siau, had noted hypoglycæmia in anæsthetised dehepatised preparations, and numerous other observers found this to occur when the pancreas had also been extirpated (see Macleod, 1926).[3]

The amount of dextrose necessary to maintain these animals in good condition varies somewhat, but the rate of injection should be such as to provide approximately one-quarter of a gramme per kilogramme per hour. If the liverless animal is exercised Mann and Magath found that the sugar requirement is considerably greater. Dehepatised, depancreatised dogs have also been found by Yater, Markowitz, and Cahoon to require large amounts of sugar. In general they need somewhat less than animals with the pancreas intact. Sugars other than dextrose are relatively ineffective, but I will not discuss this subject in detail.

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liver) has been detected. While it is possible, as has been suggested, that a small tumour might escape attention, it is by no means clear that the history of the development of the surgical treatment of hyperthyroidism will be repeated in this instance. From the point of view of the physiologist it would appear more rational to attempt to increase gluconeogenesis by administering a suitable extract of the anterior lobe of the pituitary, if this should be made available, rather than to attempt to remove sufficient pancreas so that the amount of insulin liberated is reduced to compensate for an inadequate supply of the diabetogenic substance of the anterior pituitary. The evidence which suggests that this diabetogenic substance acts in part at least by a direct stimulation of the liver to produce sugar will be reviewed in the next lecture. The rational treatment of these cases at present consists in: (1) Supplying carbohydrate. (2) Stimulating new production of carbohydrate. Liberation of stored glycogen can only have a transient effect. Some success has been secured by thyroid therapy, but here the increased production of sugar by the liver may be negatived by the increased consumption of sugar which thyroxine also produces. (3) By the surgical removal of a tumour, if it should be present. To this list there may shortly be added the use of a potent diabetogenic substance prepared from the anterior pituitary. If, as may well be the case, the therapeutic effects of the extract from the anterior lobe are not satisfactory, the clinician will probably be forced in severe cases of spontaneous hypoglycæmia to recommend excision of a large part of the pancreas irrespective of whether or not the presence of adenoma is suspected.

Fat Metabolism in Dehepatised Animals

There is considerable evidence that the liver plays an important rôle in the metabolism of fat. Among his many contributions to physiology, the late Prof. Embden (Embden and Kalberlah)[6] noted that the perfused liver formed acetone from straight chained fatty acids with an even number of carbon atoms. This provided excellent support for Knoop's theory of β-oxidation. The acids with an odd number of carbon atoms apparently are not naturally occurring and therefore need not be considered.

Any worth-while discussion of β-oxidation with a consideration of the contributions of Dakin, and the more recent ones of Raper and his collaborators, and of Quick, would require a large part of the lecture hour and should be discussed by someone with greater experience in that field than I. Since ketone bodies exist in small quantities in the blood of normal animals, there is an increasing tendency to consider that these are normal products of the breakdown of fatty acids. The experimental results available at present suggest, but do not prove, that the ketone bodies are made exclusively by the liver. If hepatectomy is performed on a depancreatised dog which is exhibiting a profound ketosis, the concentration of these substances in the blood begins to fall immediately (Chaikoff and Soskin).[7] This finding suggests that the ketosis of diabetes is not chiefly due to diminished utilisation of ketone bodies, but rather to excessive production, as is apparently the case with sugar. When sodium aceto-acetate is administered intravenously to dehepatised dogs, large quantities of beta-hydroxy-butyric acid appear in the blood stream. The concentration of this latter substance diminishes rapidly. When the lævo salt of beta-hydroxy-butyric acid is injected into these animals this substance is utilised without the appearance of aceto-acetic acid. (Markowitz, unpublished observations.)

The time is not yet ripe for an attempt to correlate these findings with the results of liver perfusions in which the ketone bodies have been added to the circulating blood or with those of in-vitro experiments on the oxidation of the fatty acids.

The evidence that dehepatised animals utilise fat normally is largely based on the carefully controlled experiments of Drury and McMaster.[8] The fate of their interpretation, like that of many another contribution, depends on the meaning which may be attached to an R/Q which is in the neighbourhood of 0·7. The fact that the quotient in fat fed animals remains at this low level after removal of the liver presumably indicates either that resting muscle tissue utilises fat directly or that sugar is formed from fat in the liverless preparation. The former interpretation has the advantage of simplicity, and while the frequent attempts to obtain direct evidence have thus far consistently failed, the great difficulties inherent in this type of experiment should of course be appreciated.

Liver Function Tests

The interpretation of many of the liver function tests has been quite recently discussed from a physiological point of view by Green, Snell, and Walters, by Mann and Bollman,[9] and by Poulsson. It is perhaps worth while emphasising again that the liver may respond normally to several of the function tests and yet yield an abnormal result to another one. One difficulty, of course, in the interpretation of the results of these tests is the uncertainty that we are dealing with the function of the liver cells alone. The second difficulty is that many of these liver function tests may yield a normal result when only a fraction of the normal amount of liver tissue is present in the animal. From the physiological point of view the uric acid function test has certain advantages. Uric acid is apparently dealt with only by the liver. The first abnormality Mann noted, when the amount of liver tissue was reduced gradually by repeated lobectomies in animals provided with an Eck fistula, was accumulation of uric acid in the blood. In his work on dogs he obtains the most satisfactory results with the uric acid tolerance test. MacLean and I have recently had some experience with the uric acid, the galactose, the bilirubin, and the bromsulphalein tolerance tests. The uric acid test usually produces no disturbance in diabetic dogs, and it appears to be as useful as any under the conditions of our experiments. There have been cases, however, in which the uric acid curve was normal, but either the disappearance of bromsulphalein or galactose was definitely retarded. The situation at present is that several of the tests should be conducted before the conclusion is reached that no abnormality is demonstrable. Glucose and fat tolerance curves may also be expected to give some idea of the condition of the liver cells, but here again, of course, the action of the liver is only one of the many factors which must be considered. A few remarks may be made about these procedures before returning to a very brief consideration of the more specific liver function tests.

GLUCOSE TOLERANCE CURVES

One is becoming more and more convinced that the procedure frequently followed in conducting glucose tolerance tests places far too little strain on the mechanisms involved. It is preferable to determine how much dextrose an animal can assimilate without exhibiting a marked hyperglycæmia or glucosuria (Woodyat) rather than merely to administer one dose of sugar intravenously and to study the rate of decrease of the blood-sugar. If the usual method is adhered to, two tests in quick succession have been reported to reveal an abnormality not apparent in the results of the first test. If the sugar is administered by the oral route the interpretation of the results of the tests may, under certain circumstances, be further complicated by the fact that in the normal intestine of the rat and the dog, and probably in other animals, dextrose absorption apparently is practically always proceeding at a fixed rate. It might, therefore, be difficult to demonstrate an increased tolerance even if it should exist, and for the same reason considerable decrease might take place before it would be obvious. If the intestine is not normal still another variable is introduced.

FAT TOLERANCE CURVES

As far as I am aware no one has been able to obtain consistent fat tolerance curves in experimental animals. Miss Huntsman and I have tried to secure uniform results in dogs. The fat which we wished to study yielded so little lipæmia that further attempts to obtain a consistent curve after the administration of this material were abandoned. Olive oil, cream, and various other mixtures of fatty substances, of course, produce a definite lipæmia which may disappear within six to eight hours. When, however, an attempt was made to produce comparable curves in the same animal with the same amount of oil on different occasions, under apparently standard conditions, little success was secured. Fluoroscopic investigations showed us that one cause of these irregular results was variation in the rate at which the fat leaves the stomach. We resorted to a highly unphysiological procedure in an attempt to surmount this difficulty. Mann-Bollman fistulæ were created in several animals and the olive oil was introduced through these directly into the duodenum. Here again, while two curves might be comparable, the third would perhaps be grossly divergent. Since our desire was to study the effect of choline on the absorption of fat and not at that time to conduct a research on fat tolerance curves, we abandoned the attempt in the hope, which has not as yet been realised, that direct determination of the fat remaining in the intestine of small animals at various intervals after administration might yield more consistent results.

THE OTHER FUNCTION TESTS AND THE FAT AND CARBOHYDRATE RESERVES OF THE LIVER

If one is interested primarily in the effectiveness of the liver as a whole in the performance of certain duties, obviously the only method of study is to place a strain on this mechanism and to investigate the response. If one is interested, however, in the state of the carbohydrate or fat content of the liver cells, the only reliable procedure is to obtain a specimen of the liver tissue and to conduct chemical and histological studies. It is desirable to correlate the chemical with the histological findings and not to rely on either alone.

It has been reported by Harding that a diet rich in fat causes a rise in the level of blood uric acid and an increased excretion of this substance in the urine. This may be due in part to an effect on the kidney, but there is some evidence that such a diet diminishes the power of the liver to remove bromsulphalein from the circulation (Rosenthal). In the normal animal some 90 per cent. of the recommended intravenous dose of this dye is rapidly excreted in the bile. The well-established effects of diets high in fat or carbohydrate tolerance might be discussed here but the extent to which the liver is involved in this very definite change is at present unknown. While it is possible that under certain circumstances mere mechanical effects of crowding the liver cells with fat may interfere with their function in certain species, it is important to remember that in other organisms it is apparently normal to have very large percentages of fat present. Whether the very high fat content of the liver in hibernating mammals plays any part in their decreased metabolic rate may be worth considering. A slight increase in liver fat in an animal under certain conditions may be of considerable pathological significance, while a more extensive deposition under other circumstances apparently is not associated with any abnormality of liver function.

The relationship existing between the glycogen content of liver cells and their function furnishes an interesting subject for discussion. It is true that almost complete absence of glycogen is compatible (for a short time) with an increased activity of liver cells. This is seen in diabetic animals four or five days after the supply of insulin has been discontinued. The glycogen content is very low, the liver is producing large amounts of dextrose, and liver function tests may give normal results. In general, of course, conditions which exhaust liver glycogen encourage the development of fatty changes in the liver cells. I will not take time to review the experimental and clinical evidence that the presence of glycogen in the liver cells renders the organ more resistant to various deleterious influences—anæsthesia, arsenicals (or bacterial products), phloridzin, &c. It will be appreciated that glycogen deposition in the liver is only one of the effects produced by sugar infusion. It is possible that the increased amount of insulin liberated may decrease gluconeogenesis—i.e., decrease the activity of the liver cells. In other words, the presence of glycogen may be incidental.

If one is interested both in liver function and the state of the carbohydrate and fat contents of the cells, MacLean and I have found that a useful procedure to follow in dogs is to conduct the uric acid and the bromsulphalein tolerance tests and to correlate the results of these with those of chemical and histological studies made on a specimen of liver obtained at biopsy. In dogs it is preferable, as Mann has pointed out, to tie off the pedicle of a lobe and to remove the lobe completely. No tissue that is likely to become necrotic should be allowed to remain. We have used this technique frequently with success even in diabetic dogs with very fatty livers. Morphine and local anæsthesia or intravenous amytal may be used when one is primarily interested in liver carbohydrate, but nitrous oxide or ether are satisfactory, as far as is known, when only the fat content and histological appearance are under investigation. Under favourable conditions surgeons do not hesitate to remove a small piece of human liver for histological investigation, and happily chemical studies are also beginning to be made on this material.

Margin of Safety of the Liver and Restoration of Liver Tissue

These subjects are too broad to be considered in any detail at the present time, but far too important to be entirely ignored. The margin of safety which the liver possesses may be illustrated by the fact that when 80 per cent. of the liver has been removed from dogs the fasting blood-sugar is normal, although other evidence may betray the existing hepatic insufficiency. It is for this reason probably that hypoglycæmia is observed only as a terminal phenomenon in clinical cases of yellow fever and acute yellow atrophy of the liver, in which histological studies of the liver cells make an investigator marvel that the tissue can perform any function whatever.

The second important point to realise is that liver tissue apparently possesses a tremendous capacity for compensatory increase in bulk (Fishback[10]).

when injected into pregnant women. It may be of interest to note that in the case mentioned by Waldstein he found that œstrin was diminished in the blood and urine, as well as in the placenta, at parturition. Large doses injected into animals will bring on abortion, as shown by Parkes.[17] If injected with Pitocin abortion came on in from 1 to 6 hours, but with œstrin not until 36 to 48 hours after injection.

It is interesting to note that a fresh set of corpora lutea can be added to the ovaries as desired, and in the rabbit ovulation can be induced at any stage of pregnancy by a single injection of extract of anterior lobe or the urine of a pregnant woman. These experiments were undertaken by Franklin S. Snyder[18] in an attempt to determine the rôle of the corpora lutea in parturition. Although the ovaries may be absent it may show that certain hormones injected into the circulation may influence uterine contraction.

UTERINE EXCITATION

Reviewing all that has been done with regard to these experiments, there seems to be strong evidence in favour of some hormone of an oxytocic nature being the cause of the uterine excitation starting labour. The source of this hormone has yet to be discovered. Although animal experiments suggest a synergistic action between œstrin and pituitrin, it is well known that the isolateduterus bathed with œstrin is more sensitive to pituitrin as shown by the increased contraction, but there is no evidence that œstrin is the cause of uterine contraction in labour. It was shown by Dodds that enormous doses of œstrin would be necessary to have any important effect in starting labour. The theory that in early pregnancy œstrin is held in check by the luteinising factor in the ovary, placenta, and anterior hypophysis, and that the inhibiting action is released with the maturity of pregnancy cannot be accepted, for we know that pregnancy can go to term without either the ovary or the pituitary, unless it is presumed that some other secretion, as suggested by Halban, might exert action similar to the ovaries. Thornwell Witherspoon[19] administered ovarian follicular fluid in the form of theelin in various doses to ten pregnant women at term, and labour occurred within 36 hours in two cases only. The same hormone in the form of amniotin or progynon was given alone or in combination with pituitrin or pitocin in various doses and at different times to 30 women at term, and only seven were delivered in 36 hours. To test whether there might not be an oxytocic factor present in the blood of parturient women, 25 c.cm. of blood taken from women in hard labour were injected into three women at term; one was delivered in 11 hours. In the case of 45 full-term women in only 22·2 per cent. labour was apparently induced by hormonal injections. The fact that labour started so quickly after the injection of blood from a woman in labour is interesting, for it must approach the normal oxytocic material, but it must be remembered that hormonal injections are not the only ones which will produce oxytocic material in the blood. What we have to discover is something sufficiently powerful to excite the uterine ganglia to produce contractions. Œstrin is certainly of no use, and it is obvious that enormous doses would be required, considering that there is already a large amount of this material circulating in the blood at term. Blau and Hancher[20] proved that the intravenous injections of various extracts besides that of the ovary (spleen, liver, testes, &c.) also produced oxytocic substances in the cerebrospinal fluid. Notwithstanding all the time and labour bestowed on experiments with a view to discovering from a maternal source the constitution of the material in the blood which acts on the uterine ganglia, nothing has been definitely established. And here it may be remarked that these experiments have been carried out with a view to determining the presence of some oxytocic material in the blood-serum, renal secretion, and cerebro-spinal fluid, as well as the chemical, physical, and spectroscopic investigation of the blood of parturient women.[21]

THE FŒTUS

Turning to the fœtus, we know that the blood, as it comes from the umbilical cord, is entirely different from that of the maternal circulation. This must be accounted for by secretions from internal glands being poured into it during its passage. The blood in the umbilical vein passes directly to the undersurface of the liver, where divisions go to the left lobe and to the lobus quadratus and lobus spigelli. Therefore the first changes must take place in the liver, which may contain many hormones. We do not yet know enough about the secretions of the fœtal internal secretory glands, and investigation is obviously extremely difficult. The thyroid has a colloid-like secretion at four and a half months.[22] The suprarenals contain adrenaline at 16 months, and the pituitary gland shows an active principle at eight months. Therefore all these glands are acting at maturity. It is certainly remarkable that the fœtus should have such a large liver,[23] weighing one-eighteenth part of the total body-weight of the fœtus. The blood of the fœtus differs materially from that of the mother; there is an excess of non-volatile acid compounds—an acidosis of birth.[24]

After consulting many authorities, Karnitski[25] in his review states that the iron and hæmoglobin contents are greater in the fœtal than in the maternal blood, and that nucleon or phospho-carnic acid is found twice as great in amount in the fœtal blood as in that of the placenta. Joseph[26] has assayed the urine of new-born infants and reported certain factors, and that no hormone was present after the fifth day. When a child is born, the intense contractions of the uterus cease. From a series of experiments, it has been shown that the blood taken from the umbilical cord immediately upon birth contains substances which promote the activity of the uterus in a guinea-pig to a greater extent than other blood, or that of the mother.[27] There is very little theelin in extracts of embryo, although it has been demonstrated in the umbilical cords of human fœtuses at term.[28]

CONCLUSION

In conclusion, I may say that notwithstanding numerous experiments carried out during this research on the blood, tissues, secretions, &c., of parturient women, they have failed, as already mentioned, to yield convincing results.

With regard to the fœtus, Dodds says: "A very careful study of the tissues of the fœtus has been made in the attempt to trace substances capable of initiating the changes associated with labour. Up to the present these have not met with success, but it is felt that continued careful study of such extracts may open up a new line of approach."

In my own opinion there is a possibility that in the future more delicate biochemical tests may be forthcoming which will throw new light upon this research, and enable us to prove definitely the actual constituents of maternal and fœtal blood. Much time and labour have hitherto been devoted to the pregnant and parturient woman. In future, more attention will be paid to the fœtus. I am glad to say that a fresh set of experiments is about to be undertaken, the results of which will be published later, for this research will continue. If success should be achieved it need hardly be said that it will be a lasting benefit to countless generations to come.

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CHANGES IN THE CENTRAL NERVOUS SYSTEM DUE TO ELECTROCUTION

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THE pathological changes that are found in the brains of persons dead from electric shock, whether by lightning stroke or by accidental contact with high-tension conductors, fall into two main groups.

There are those changes that result from any form of severe mechanical damage of the skull and of its contents, and those changes that are found only in fatal cases of electrocution. The former group can in many cases be accounted for by a fall or a blow received at the time of the accident, and no other explanation of their occurrence is necessary. The latter group of changes are peculiar to this (electrical) form of damage and their explanation is therefore to be sought in some property of this particular variety of injury—i.e., in terms of some property of electrical discharges.

These lesions of the central nervous system which are peculiar to the brains of fatally electrocuted persons are as follows :—

(1) The cerebro-spinal spaces are dilated ; in the main subarachnoid spaces there is wide separation of the pia from the arachnoid and the perivascular spaces are often greatly distended.

(2) There are abnormal holes or spaces in the brain due both to rents or fissures in its substance and to the local separation, by splitting apart, of adjacent cortical layers.

(3) The ganglion cells are damaged with unequal severity in different groups, but in a way which points in many cases to their disruption in a peculiarly sudden and violent manner.

(4) The blood-vessels are severely and extensively damaged, especially the larger ones at the base of the brain ; their muscular coat suffers most and is sometimes *completely ruptured.*

These lesions have been found after every precaution has been taken to avoid similar distortion of the tissues due to faulty fixation and staining methods. Their occurrence has always hitherto been explained in one of three ways—i.e., as being due either to the heating effect, to the electrolytic effect, or to the mechanical effect of an electric current.

HEATING EFFECT OF THE CURRENT

In a large number of cases of fatal electrocution it is certain that the current passing through or over the body is sufficient to produce somewhere in its path enough heat to account for severe damage to the tissues.

Thus, if we consider the case of legal electrocution as carried out in America—in which 2300 and 550 volts are applied in succession for 7- and for 52-second periods respectively, and each repeated once[1]—since we know the resistance of the body to be about 200 ohms in these circumstances[2] we can estimate that the heat liberated during this electrocution must be

$$\left[\left(\frac{2300}{200}\right)^2 \times 200 \times 14 + \left(\frac{550}{200}\right)^2 \times 200 \times 104\right] \times 0{\cdot}239 \text{ calories.}$$

This will be sufficient to raise the temperature of the whole body of a man of 10 st. through

$$\frac{0{\cdot}239 \times 200 \times (12^2 \times 14 + 8 \times 104)}{140 + 454} \text{ degrees centigrade}$$

or 3½ degrees Fahrenheit.

Since the conductivity of the cerebro-spinal fluid is about 150×10^{-4} (Eckel[3]), of the blood is about 120×10^{-4} (Strohl[4]), and of the other tissues of the body so much less than either of these, it is probable, as Langworthy and Kouwenhoven have stated,[2] that most of the current goes through the blood-vessels—but also much through the cerebro-spinal fluid which, although less in volume and more confined in extent, has the lower resistance. If we take the total cerebro-spinal fluid volume to be about 150 c.cm. and the total blood volume to be about 4 litres, and assume that the specific gravity and the specific heat of both these fluids is about unity, then we see that the above amount of heat—if confined to these tissues in which the current mainly passes—will be sufficient to raise their temperature through

$$\frac{0{\cdot}239 \times 200 \times 2848}{4150} \text{ C.°—i.e., through } 60° \text{ F.}$$

Now we know that in cases of legal electrocution temperatures of 145° F. have been measured in the cerebro-spinal fluid several hours after death[5]—i.e., a rise of presumably about 145–98° or 47° F. Therefore this rise in temperature can be well accounted for by the quantity and form of electricity used : it is sufficient most seriously to damage the central nervous system, but, as will be seen later, it is not capable of producing the lesions here in question.

When we attempt a similar calculation in cases of lightning stroke we are reduced to defining the probable upper limits of heating, since we have no precise data such as are available in the case of legal electrocution.

The total electrical energy in most lightning flashes varies from 5 to 50 coulombs [9] and 20 coulombs may be taken as a reasonable average.[10] If this quantity of electricity were passed entirely through the body, then, since the average head-to-foot resistance of this, in the absence of special electrodes and with a normal condition of the skin, is about 5750 ohms,[6] the heat evolved will be not more than

$$20^2 \times 5750 \times 0{\cdot}239 \text{ calories.}$$

This will be sufficient to raise the temperature of the whole of the body of a man of 10 st. through

$$\frac{20^2 \times 5750 \times 0{\cdot}239 \times 9}{140 \times 454 \times 5} \text{ F.°—i.e., through 14° F.}$$

The actual rise of temperature along the path of the current is much higher than this—as is shown by the linear burning of the skin. It is to be presumed that the amount of the total current which passes actually through, and not along the surface of, the body produces heating locally in its path, and the same considerations that were discussed above in relation to legal electrocution will hold here also. But as we have in this case no idea whatever of the amount of current passing through the body we cannot again in the same way estimate the probable amount of heating of the blood and cerebro-spinal fluid.

Yet even if we assumed that in the case of lightning stroke also there was a great local rise of temperature within the blood and cerebro-spinal fluid spaces—in neither of these cases could the observed lesions be explained in this way.

The coefficient of expansion by heat of the tissues of the body is relatively small. Liquids expand more than do solids, yet if we assumed that all the cerebro-spinal fluid in the nervous system were raised to boiling point its total volume of, say, 150 c.cm. would be increased between 37° and 100° C. only to 150 × 1·0042—i.e., to 150·6 c.cm.—a total increase of volume of about 0·5 c.cm. This certainly cannot cause any wide dilatation of the subarachnoid spaces, and the only possible way in which heat expansion alone can give rise to these changes is by actually boiling the blood and the cerebro-spinal fluid so that steam is given off under pressure sufficient to distend the tissues.

It is unlikely for two reasons that this does in fact take place. In the first place, the lesions in question are found in nearly all cases of fatal electrocution whether by lightning or by high-tension conductors and yet survivors from these accidents rarely have any permanent damage of their nervous system, so that it is most improbable that the degree of heating indicated above is ever approached. In the second place, the amount of heat available *in some cases in* which these lesions are found is not sufficient for this purpose.

Thus in the case of legal electrocution the 1200 coulombs of heat available is sufficient to raise the *blood and cerebro-spinal fluid through about 30° C.*, as has been shown above; it is not sufficient to raise it *anywhere near* to boiling point which would require 4150–63, or about 260,000 coulombs. Moreover the blood remains fluid and therefore cannot have been heated anywhere near to boiling point.

Therefore heating alone cannot account for the lesions observed and cannot make any serious contribution—by producing local expansion of the tissues—to their formation, although by causing coagulation of the tissues around the blood-vessels it may alter them in a way which leads to subsequent shrinkage during fixation.

ELECTROLYTIC EFFECT OF THE CURRENT

It has been suggested by Spitzka and Radasch [7] and quoted by others [8] that the dilated spaces and tear in the nervous system may be produced by the expansion of gases liberated by electrolysis from the tissue fluids. When a current is passed continuously in one direction through a conducting fluid which is an electrolyte, gases may be liberated at the places of entry and of exit of the current; they will not be liberated at intermediate places in the fluid.

Thus, in the first place the production of these changes in the nervous system by an *alternating* current is not accounted for, and in the second place no multiple, local, gaseous collections will occur. If the physical quantities involved are taken into account, this explanation is seen to be still less adequate, even for any case to which it might be otherwise applicable.

Since the electrochemical equivalent of oxygen is 0·00008293—i.e., this weight of oxygen is liberated by *1 coulomb of electricity—it follows* that the whole of the electric energy in an average lightning flash of 20 *coulombs* [9] will produce *only* 8293 × *20* × *10*—^{8} grammes of oxygen which will occupy at the normal body temperature

$$\frac{22{\cdot}4 \times 8293 \times 20 \times 10^{-8} \times 310}{32 \times 273} \text{ litres or about 1 c.cm.}$$

At the same time 2 c.cm. of hydrogen will be liberated so that the whole of the lightning flash if it all passed entirely through the electrolytes of the body would produce only 3 c.cm. of gas, an amount which cannot make any serious contribution to the production of the lesions in question.

MECHANICAL EFFECT OF THE CURRENT

Hassin [1] has examined the explanations given in terms of heating and of electrolysis and has rejected them on purely circumstantial grounds—i.e., on the absence of similar changes in cases of fatal hyperthermia and of caisson disease.[1] He considers that the changes are "due to purely mechanical factors. The action of a strong electric current is equivalent to direct mechanical injury . . . a momentary violent jarring . . . the mechanical factor—the jarring—is the electric current." [1]

That Hassin is right in his opinion that heating and electrolytic effects *alone cannot account* for these lesions follows from the calculations that have here just been *made*, but the *meaningless* expressions quoted above do not provide any reasonable alternative: to state that "the mechanical factor . . *is* the electric current" (see above) has no meaning; in fact, the mechanical factor is not even *due to* the *current*. The only mechanical effects that attend the presence of neighbouring electric currents are due to the electromagnetic forces; these are entirely negligible in the case of currents passing through the body and, such as they are, they will tend to produce contraction and approximation of the conductors along which they pass and not dilatation.

From the above it follows that none of the effects of a current passing through the body can account for the peculiar disruptive lesions in the central nervous system and an alternative explanation is needed.

It should be noted that explanations have hitherto been advanced only in terms of the electric *current* set up by the passage of a *quantity of electricity* through the body. No attention has been paid to the forces due to the presence of this electric *charge* upon the body. These will now be considered.

ELECTROSTATIC EFFECTS OF LIGHTNING AND HIGH-TENSION SHOCKS

It is in no case simple to decide what is the electrical state of affairs present when a man is electrocuted either by lightning stroke or by coming accidentally into contact with a conductor at high potential. The path of the current through the body can only be guessed at from a knowledge of the physical factors involved, and our knowledge even of the quantity and of the form of the electric energy supplied is in most cases uncertain. In the case of legal electrocution we know most about these factors, for we know the effective voltage, the resistance of the body, and the duration of the current. In the case of lightning stroke we know least—even the accepted physical views of just what is happening in the occurrence of a lightning flash have been profoundly modified [10 11] twice in the last five years.

An uncharged conducting body which is brought into electrical contact with a charged conductor becomes itself charged and will remain at the same potential as the originally charged conductor so long as the contact is maintained. If now the conducting body which has been charged in this way be removed from the originally charged conductor and come into contact with yet another conductor at a lower potential it will share its acquired charge with the latter—e.g., if it be earthed, the acquired charge will all run to earth and the final potential will be that of the earth. But should this happen while contact with the originally charged conductor is maintained the conducting body which received the charge will continue to do so, and a current will flow through it to the earth.

Thus if a man make effective contact with a conductor at high potential or if he be struck by lightning he will become suddenly highly charged with electricity, but a current will pass through him only if he is in a position to lose this charge in some way. The surrounding air will take away a little gradually,[10] most rapidly from angles and promontories of his person, but without setting up any current within him. If, however, he is making effective contact with the ground or with some conductor at low potential at the moment of the accident then the rate at which the charge passes through or over him will depend upon how good this contact is. If it is good, then the charge will pass away from him as rapidly as it is received, the current through or over him will be large and no charge will accumulate upon him. If it is poor, then the current will be smaller and the average charge maintained upon him will be proportionately greater. As a result of the current passing through him the heating, electrolytic, and mechanical effects discussed above may be anticipated. As the result of the charge upon him his body will become subject to certain forces which will be discussed in detail later and which are known as the electrostatic forces.

In the case of lightning stroke this distribution of current and of electrostatic effects will depend upon the degree of insulation of the man from the earth. If he makes good contact with wet ground through damp boots, then the current will be great and the effects of the static charge slight. If he makes poor contact with dry ground through boots that are thick and free from many nails, then more charge will accumulate upon him and for a longer period, and the electrostatic forces will be strong. That these differences in the effect according to differences in contact with the ground are not merely a matter of theoretical conjecture, but also of observed happenings, is to be seen from the eye-witness accounts that Spencer has recently published from his own personal observations.[12] He has pointed out that persons standing on wet soil when struck by lightning may fall to the ground in pain from powerful contraction of their muscles and yet have no memory of having received any blow and have no bursting apart of their clothing.

Langworthy and Kouwenhoven have shown that when a strong current is passed through the body of an animal the whole musculature becomes violently contracted, usually in tetany with an alternating current and in clonic jerkings with a direct current.[2] Another account of Spencer's illustrates the opposite effect: in circumstances of poor conduction to the ground inside a dry shelter the charge may accumulate upon the body with sufficient tension to escape from a flexed elbow on to another person standing nearby who is killed by receiving it.[12]

The electrostatic forces upon a charged body are derived from the mechanical repulsion which is exerted between all similarly charged particles or bodies. In the first place a charged body will be repelled from all similarly charged bodies with a force that depends only upon the amount of these charges and the distance between them. In the second place all those separate, constituent parts of the body which carry the charge will be repelled from one another.

Let us examine first the part that these forces may be expected to play in bringing about the effects of electrocution upon the body as a whole, and later the contribution that they may be expected to make to the production of the lesions inside the body.

The immediate effects, as seen by bystanders, of coming into contact with a conductor at high potential or of lightning stroke vary in different circumstances. In many cases, in which a man actually grasps a high-voltage conductor, he is sufficiently well earthed for the current through him to be initially strong, and the tetanic contraction of his arm muscles produced by this current causes him to remain clasping the charged object. In other cases widespread spasm of his whole musculature jerks him in some direction which may be either away from or towards the source of the shock. In some cases, in which two men standing near together are holding a conductor that suddenly becomes highly charged, they may be flung violently several yards apart—an instance of this repulsion is cited by Pearl.[13]

The immediate effects of lightning stroke are fairly well known: the following analysis of these effects is based upon the detailed accounts that have recently been given by Spencer of many such accidents that he has personally observed.

From these accounts we learn that when a man is struck by lightning he falls or is flung to the ground. He may afterwards remember having felt as though he received a stunning blow to the head. He is found to have a circumscribed effusion into the scalp over the top of his head. His skin is burnt both with characteristic linear brush-burns, over which the clothing is completely burst through, and also more severely beneath any metallic object carried about the person. These results are found in most cases of lightning stroke and are independent of the circumstances in which the man may be placed at the moment, but the circumstances provide other additional results of a similar nature.

Thus anything that the person struck may be holding is flung away; a bundle carried is burst open and its contents scattered[12] (p. 34); a baby held in its mother's arms is flung violently away with sufficient force to knock over another person sitting a few yards off (p. 41).

If the person struck is standing on or walking over open, flat country he falls directly to the ground (p. 43). If he is standing near to other objects that also are struck he will be flung away from them; when a group of men are struck while standing close together they are flung apart in different directions (p. 38); when a man is struck while standing close to some rigidly fixed conductor such as a tree or a tent pole (p. 72) he is flung directly away from this.

These effects have been explained in many different ways. The tetanic contraction of the muscles can account for the sudden "crumpling-up" of the man and his fall to the ground; it certainly could not jerk him through 9 or 12 yards or cause the other "repulsion" effects above described.

All these violent mechanical effects were originally ascribed haphazard and uncritically to "electricity." Recognising the need for some more scientific explanation, Sir Oliver Lodge ascribed them to violent commotion of the air around the path of the lightning flash, due to highly compressed air pushed before the current. As an alternative, others have suggested that the sudden air commotion may be due to heating and expansion. Examination of the actual happenings in cases of lightning stroke shows that neither of these explanations is valid. It has been pointed out that there is nearly always an effusion beneath the scalp of the person struck; this suggests that a heavy blow has been received but it can in fact always be distinguished from the effects of such a blow by the complete absence of superficial abrasions (ibid., p. 31). Violent commotion of the air sufficient to fling a man 12 yards away would certainly displace other movable objects in the immediate neighbourhood, but it is found that only persons and objects which actually share in the discharge are displaced in this way. There are many examples in Spencer's book of a full lightning flash passing to earth without displacing an object standing a few feet away when this object does not become charged (p. 72), and others which show that so little commotion of the air itself may occur that sleepers in a tent, down the pole of which the lightning strikes, may sleep on undisturbed (p. 83).

It is doubtful if expansion of the air by heating can, as is popularly supposed, account for the stripping off of the clothing. Although the clothes are burnt through with the heat this is only along linear burns, and since the air is a very poor conductor of heat this intense local heating will not have much effect in expanding any but the immediately adjacent air; the skin elsewhere on the body is conspicuously free from signs of heating and yet the clothes may be completely stripped off, leather belts and boots burst and discarded in a way that suggests that they have been repelled from the body in all directions.

The sudden violent displacement from one another only of those persons or objects that are struck must be due to the appearance of mutually repulsive forces between them that depend upon the reception of the electric charge. These forces may, in quite ordinary circumstances, be very great.

Thus we may examine the conditions when a man is standing in the shelter of a tree when both are struck by lightning. If we assume that the total discharge is 20 coulombs[9] and that only one-hundredth part of this reaches the man, the rest passing to the tree, that the man is standing 3 metres away from the tree and that only one-tenth of the charge on the tree is effective as being near enough to the man, then we find that he will be repelled from the tree with a force of

$$\frac{\frac{1}{100}\text{k} \times \frac{99}{1000}\text{k}}{300^2} \text{ dynes, where k} = 20 \text{ coulombs}$$

$$= 20 \times 3 \times 10^9 \text{ electrostatic units}$$

this is a force of

$$\frac{400 \times 9 \times 10^{18}}{9 \times 10^7} \text{ or } \underline{4 \times 10^{13} \text{ dynes.}}$$

This force acting upon a man of 10 st., as an impulse, will give him a velocity "V" away from the tree where "V" is given by

$$\begin{aligned} \tfrac{1}{2} \times 140 \times 452 \times V^2 &= 4 \times 10^{13} \\ \text{or } V^2 &= \frac{8 \times 10^{13}}{140 \times 454} \\ &= 1{\cdot}2 \times 10^9 \\ \text{i.e., } V &= 3{\cdot}5 \times 10^4 \text{ cm. per second or} \\ &\quad 35 \text{ metres per second.} \end{aligned}$$

If the man is standing erect when he is flung away with this velocity, and if he is 5 ft. 9 in. tall so that his centre of gravity is about 3 ft. from the ground, he will take a time "T" in falling freely to the ground where "T" is given by

$$3 = \tfrac{1}{2} \times 32 \times T^2, \text{ i.e., } T^2 = \frac{6}{32},$$

then he will be flung on to the ground a distance "D" away from where he was standing, where "D" is given by

$$\begin{aligned} D &= 35 \times T \text{ metres.} \\ &= 14 \text{ metres, or } 17 \text{ yards.} \end{aligned}$$

The chief assumptions used in making this estimation were that the man receives one-hundredth part of the discharge, and that one-tenth of the remainder on the tree is on a part that is near enough to be effective. Both of these assumptions are within reason, and the displacement of a man in these circumstances through 9 to 12 yards by these forces can be reasonably explained.

SURFACE CHARGE IN LIGHTNING STROKE

These forces of mutual repulsion between neighbouring objects will affect the central nervous system only in so far as they may damage the body by flinging it to the ground—i.e., in the same way as would any heavy fall. It is the second set of electrostatic forces that are capable of producing specific changes inside the body.

When a conductor becomes charged by a static electric charge, this charge is all concentrated upon its surface; directly contact is made in some one place between this body and another such as the earth, this charge will all run to earth along the surface or through the body of the conductor by whatever paths offer the best conductivity. So long as any charge remains upon the surface of the body it will produce a force acting outwards upon that surface, because each element of the surface is repelled from all other elements and the total effect is that the whole surface tends to expand away from the body in all directions. If the body itself is easily distensible it will expand—e.g., a soap-bubble when charged increases visibly in size. If the body is more rigid and its parts have strong cohesion no such visible expansion will occur, but the tendency to dilate will be exactly the same; the distending or expanding forces on the surface will have the same effect as a proportionate sudden reduction in the atmospheric pressure acting upon the body.

In the case of a man of average size who receives—to make the same assumption as previously—only one-hundredth part of an average lightning discharge, the force acting outwards all over him will be

$$2\pi\left(\frac{\Sigma}{A}\right)^2 \quad \begin{array}{l}\Sigma \text{ being the total charge, and} \\ A \text{ being the total surface area}\end{array}$$

this is

$$2\pi \times \frac{3 \times 10^9}{5 \times 1{\cdot}7 \times 10^4} \text{ dynes—i.e., } 73 \times 10^8 \text{ dynes}$$

this is

$$\frac{73 \times 10^8}{1{\cdot}5 \times 10^4} \text{ dynes/cm}^2.$$

or about half an atmosphere pressure

so that the effect of this charge will be equivalent to a sudden reduction of the atmospheric pressure to half its value.

This sudden expansile force will be communicated to all the tissues within the body, passing inwards as a wave of decompression, and these tissues will yield in proportion to their rigidity and cohesion, the distortion of all spaces within soft structures and the separation of parts having little cohesion is to be expected.

DISTRIBUTION OF THE LESIONS IN THE NERVOUS SYSTEM

The characteristic histological changes within the nervous system have been summed up by Spitzka and Radasch[7] as indicating that the tissues have been subjected to "some diffusely explosive or disruptive force." Langworthy and Kouwenhoven have described the changes in the cells of the nervous system of electrocuted animals as giving the appearance of "explosive suddenness," "almost as if the cell had been blown to pieces by dynamite."[2] The histological changes that follow a severe blow to the head do not include the peculiar changes that are here described. The localised gaps and tears and widening of perivascular spaces are due either to disruptive forces originating locally, or to the sudden local yielding of the tissues in many places to some general expansile force.

It is difficult in any given case to say what particular combination of the electrothermal, the electrolytic, and the electrostatic effects is responsible for a given lesion in the brain. It is more easy to explain why the lesions which are in fact found, are present in the particular situations in which they do occur.

It has been seen that the electrostatic effects will produce the greatest changes in the nervous system in those places where rigidity is smallest and cohesion least. This suggests that their maximal effect will be upon the fluid spaces rather than upon the brain substance and, in respect of the fluid spaces, greater in the subarachnoid space and its smaller ramifications which do not possess special sheaths than in the blood spaces, which are surrounded by elastic and muscular walls.

The heating and the possible electrolytic effects will be greatest both outside and inside the body where the electrical conductivity is highest. Outside the body this is along creases in the skin where sweat has collected[12] and over metallic objects to which the charge has been attracted. In the central nervous system as a whole, electrical conductivity is best in the cerebro-spinal fluid,[3] not quite so good in the blood,[4] and very much smaller in the brain substance.[2] The current effects of heating should therefore be greatest in the cerebro-spinal fluid spaces and next in the blood-vessels. In respect of current passing through the substance of the brain itself, it is interesting to note that from their electrical experiments on animals Langworthy and Kouwenhoven have found that the Purkinjé cells suffer an exceptionally severe amount of damage,[2] while Hassin has found that the tearing apart of adjacent cortical layers in man is particularly conspicuous between the damaged Purkinjé cell layer and the granular layer in the cerebellum.[1]

The proportion in which the causation of these lesions in the central nervous system peculiar to fatal electrocution is to be ascribed to *current* and to *electrostatic* effects can only be decided when we have a more accurate idea of the electrical state of affairs within the body than we have at present. The observed distribution of these lesions seems to correspond closely with what is to be expected from a theoretical consideration of the known possibilities.

SUMMARY

Reasons have been given for believing that the heating and electrolytic effects of high-tension currents cannot be held responsible for the production of those lesions in the central nervous system which are peculiar to fatal electrocution and to lightning stroke. The contribution of electrostatic forces to the production of these lesions is discussed.

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TREATMENT WITH THE CARBON DIOXIDE SNOW PENCIL

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THE chief difference between the destructive action of the hot cautery or the cold cautery (diathermy) and CO_2 treatment may be summarised in two words: vital reaction. You cannot destroy a tumour or a vascular nævus on a cadaver by freezing it, although obviously you can burn it away. Vital reactions are never immediate to the naked eye. Even the weal of the stinging nettle or t[illegible]e whip lash takes an appreciable time to develop; [illegible]s *also* a vital reaction and cannot be produced af[illegible] *death*. These points are fundamental, and import[illegible]f the mechanism of CO_2 treatment is to be [illegible]*stood*. The effects are the result of damage t[illegible] *delicate* endothelial walls of blood-vessels, [illegible]*sequent* exudation of serum (causing a b[illegible] *develop* locally), and ultimately a reduc[illegible]e *blood*-supply to the area frozen. This k[illegible]*al necrosis* to an extent depending on two factors: (1) the length of time during which the pencil was in contact with the tissue; and (2) the pressure with which it was applied, and the counter-pressure of firm underlying tissue. More pressure can be used on bone, for example, than on the eyeball behind the eyelids, from which no counter-pressure can be easily elicited.

It seems to follow that the more vascular a tumour the more vulnerable it should be to the effects of freezing. Within limits this is true, but it must be remembered that blood—free blood as in a large cavernous angioma—is a bad conductor of heat (and, therefore, of cold); and that it is by no means always possible to empty the tumour of its blood before it is frozen. Moreover, a cavernous angioma is deficient in normal endothelium, and in the sympathetic connexions that are responsible for the vital reactions producing exudation and subsequent necrosis. Fibrous tissue contains relatively little vascular tissue, and it is doubtless for that reason that freezing will have little effect on a fibroma or lipoma or even on a wart unless the pencil overlaps the tumour and is able to provoke a reaction in the normal tissue in the vicinity. With cellular structures, especially if they are soft in consistence, the position is different, for these, if they contain a moderately good blood-supply, will respond to application of the pencil.

If these principles are correct, it follows that the acetone snow mixture recommended by some authors is less efficient than the pencil, for the factor of pressure is lacking, and moreover the temperature of such a mixture depends largely on atmospheric conditions and the relative amounts of snow and solvent used. It is, in fact, far less efficient, and I do not recommend it for dermatological purposes.

The vital reaction may be the chief reason for the extreme rareness of septic complications after freezing, and probably also explains the relative perfection of the resulting cicatrices, which are never hypertrophic or keloidal. Secondary contraction and resulting deformity or interference with function (of an eyelid, for example) are equally rare, and afford additional reasons for the use of this, one of our least dangerous and most efficient therapeutic weapons.

The number of conditions, both dermatological and other, that can be treated by CO_2 is very great, and a glance at the list submitted by Lortat-Jacob and G. Solente in their excellent text-book[1] suggests that there is scarcely a dermatological condition which at some stage in its evolution is not amenable to cryotherapy. The list includes acne vulgaris and rosacea, keloid, angioma, angiolupoid, aphthæ, and so on, right through the alphabet to xanthelasma and xeroderma pigmentosum. Among non-cutaneous affections, trachoma and chronic cervicitis are cited as being favourably influenced. With a little practice, and keeping in mind the dictum that it is always easy to repeat a treatment but not so easy to remove the effects of an overdose, the practitioner runs no risk of doing harm to any chronic and circumscribed condition which in his opinion would be benefited by the reaction consequent on freezing, whether he aims at producing a mild serous exudation only or a destructive or necrotic effect.*

TREATMENT OF STRAWBERRY NÆVI

As an illustration of the value and use of the method, I propose to describe its application to the condition most commonly calling for such treatment—namely, the raised, localised strawberry nævus, or angioma circumscriptum.

The patient is usually an infant, and there is no contra-indication to the application of the pencil provided the child is in normal health and not suffering from an infective skin condition. The snow is pressed into a circular receptacle or mould slightly larger than the nævus to be treated, and is then expelled by means of the piston which hammered it into shape, and wrapped in cotton-wool in such a way that about a quarter of an inch protrudes beyond the wrapping. The patient is firmly held, preferably by a nurse, and the pencil applied with a pressure of about 1 lb. weight for 10 to 15 seconds, depending on the approximate thickness of the nævus. Great care should be taken to see that overlapping is complete and, as far as possible, equidistant around the circumference. The tissues turn white and are depressed below the surface for about the same time or a little longer than was required to freeze them. Thawing soon takes place and the circulation returns. This stage is the most painful of the whole procedure, but lasts no longer than about three minutes.

Depression of the frozen surface gives place to slight elevation, and very soon a ring of exudation, considerably wider than the frozen area, makes its appearance. This may or may not progress to the formation of a bulla, which should not be immediately pricked, as it will almost certainly refill with serum. If still present some five or six hours after the operation, the fluid may be let out with a sterile needle and the small reacting area liberally sprinkled with boracic and starch powder, or calamine lotion containing a little spirit. Ointments should not be applied at this stage at all, and the greatest care should be taken to preserve the roof of the bulla, which eventually forms a firm crust and is nature's own dressing. It must not be removed under any pretext, or an indolent rapidly crusting and slightly ulcerated area will be left and the eventual scar may be unsightly or hypertrophic. The crust separates spontaneously in about ten days as a rule, and it will then be apparent to what extent the vascular tissue of the nævus has been destroyed. Residual hyperæmia must not be mistakenly regarded as angiomatous, and in any case the immediate temptation to repeat the freezing should be resisted, for another week or two, unless the original tumour was of too large a size or irregular a shape to be covered by the circumference of the pencil chosen.

In this connexion the problem sometimes arises how best to deal with some of the peculiar and grotesque shapes that are met with in practice. Patterns may be cut, after tracing out an approximate and rather larger outline of the nævus, *on oiled paper*. This is laid upon a sheet of cardboard or any other non-conductor, and the approximate shape of the nævus cut out; the cardboard frame is then placed round the nævus, interposed between the skin and the larger-sized freezing pencil, as a more or less accurate shield against freezing of normal tissue. Or, again, the area may be frozen in sections. If this is done great care must be taken *to select each of them at sufficient distance* apart to prevent overlapping and consequent double dosage.

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[1] La Cryothérapie. Paris, 1930.

As regards apparatus, a large cylinder (and spare) is an
al for hospital requirements, but for private and occasional
re is a good little pocket apparatus put up by the
Co. The dwarf cylinders are large enough to provide
w for the average case, and the cost of renewals is

OTHER USES OF THE METHOD

Early rodent ulcer is another condition for which the pencil may be used, except when it occurs on the eyelid where counter-pressure from bone is not available. In such cases radium is to be preferred. On the forehead or nose CO_2 will give results as good as radium. Sepsis should be first controlled by lotions or ointments, and crusts must be removed before the snow is applied. A minimum exposure for a rodent ulcer is one minute; firm pressure should be used and care taken to ensure that the pencil overlaps the tumour at every point of its circumference. It goes without saying that the treatment should only be used in cases which have not involved the underlying bone, and in which the infiltration is confined to the skin.

For the common wart the actual cautery is preferable, mainly because the papillomatous processes are too deeply situated for effective refrigeration; the flat seborrhœic and senile varieties of wart, however, are rapidly eliminated by snow treatment. Applications with moderate pressure vary from 20–30 seconds, and can be repeated as required. Some forms of keloidal tissue can also be treated in this way, but are best submitted to X ray or radium exposures by an expert. Soft papillomata of various types are also suitable for CO_2 treatment provided their substance is not too fibrous. Conditions other than dermatological in the mouth, rectum, and vagina, and even on the conjunctiva, have been treated by cryotherapy with excellent results.

Clinical and Laboratory Notes

A CASE OF PHLEGMONOUS GASTRITIS

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HON. SURGEON TO THE LEIGH INFIRMARY, LEIGH, LANCS

Miss A. B., aged 41, a clerk, was taken home from work at 11 A.M. on Jan. 18th on account of abdominal pain and vomiting. At 9 P.M. on the same day I saw her for the first time; there was a history of incessant vomiting and considerable upper abdominal pain. The vomiting had come on suddenly that same morning, but she had complained of a little nausea and malaise for a few days before.

Examination revealed considerable tenderness in the epigastrium; there was somewhat indefinite rigidity in the midline between the xyphoid and the umbilicus; she was able to sit up in bed of her own accord and without assistance, and contraction of the recti muscles did not cause her any pain or indeed any apparent discomfort. The axillary temperature was 104·2°, with pulse-rate 100 and respiration-rate 24; the bases of both lungs were clear.

On the morning of the 19th she was removed to Leigh Infirmary because the pulse-rate had gone up to 110. No satisfactory diagnosis could be arrived at as the signs and symptoms were extremely conflicting; the temperature remained in the neighbourhood of 104° with occasional remissions to 101° for an hour or two at a time. The respiration-rate did not rise above 28, and there were no signs of basal or diaphragmatic pneumonia. The pulse-rate went up steadily to 120; tenderness and rigidity quickly became more marked and it was clear that an acute upper abdominal catastrophe had occurred. Gall-bladder, pancreas, and duodenum did not appear to be the origin of the trouble; the most likely lesion to be encountered was considered to be a perigastric abscess with some leakage into the general peritoneal cavity.

I opened the abdomen by a right upper paramedian incision; clear free fluid welled up through the opening in the peritoneum and a large soft red tumour presented itself against the parietal peritoneum; this was the stomach, the peritoneal coat of which was much injected, the walls thick and doughy and of even consistence throughout; the swelling and thickening of the stomach ceased abruptly at the pylorus and all the organs in the upper abdomen, other than the stomach, appeared to be perfectly normal. I made a small incision through the peritoneal, muscular, and submucous coats as far as the mucosa itself; there was gross thickening of all coats, and the submucous coat appeared as a yellowish-white layer—in consistence and appearance very much like cream cheese; on squeezing the stomach wall gently, multiple beads of pus exuded from the submucous coat. A drainage-tube was inserted at the site of incision and also a large suprapubic drain. Death occurred on Jan. 22nd from general peritonitis.

Three hours after death I removed the stomach in toto; uniformly thickened, it was deeply congested on the peritoneal surface from the cardiac orifice to the pylorus. Macroscopically the submucous coat was much in evidence as a yellowish cheesy layer from which pus could be expressed with little difficulty; the mucous membrane was much injected and ecchymosed, more particularly in the pyloric antrum. There was no sign of ulceration anywhere on the mucosa itself, nor was there anything to indicate any trauma which might have been the origin of this extremely grave condition.

To Dr. W. E. Cooke, of Wigan Infirmary, I am indebted for the following histological and cultural report. "Histological examination shows purulent infiltration of all the coats. Cultures give a mixture of *B. coli* and streptococci."

The extreme rarity of this condition, together with the difficulty of diagnosis and the utterly hopeless outlook as far as treatment, either surgical or medical, is concerned, make it worthy of record as followed from the origin of the illness to the post-mortem findings.

ACUTE HÆMOLYTIC ANÆMIA

By H. A. Dunlop, M.D., M.R.C.P. Lond.
PHYSICIAN TO THE METROPOLITAN HOSPITAL, LONDON; AND
A. G. Sanders, M.B. Lond.
LATE SENIOR RESIDENT AT THE HOSPITAL

A boy, aged two years and three months, was admitted to the Metropolitan Hospital on August 31st, 1932.

The mother had noticed that on the previous day the child's urine had become dark. The bowels were costive, but the child was said by the mother to be well in himself and "not moody or ill at all." The urine was definitely stated to have always been normal until the day before admission. The child had been taking no medicine. On closer questioning the mother said that the child had had "a bit of a cold for the last week" and that although he had always been rather a pale child, the parents had for the last week "noticed a yellow look about him."

Condition on examination.—Skin and mucosæ pale. Conjunctivæ yellow. Fat child. Tongue moderately furred. Tonsils ragged. Teeth good. Heart not enlarged. Systolic murmur at pulmonary area. Lungs: nil abnormal discovered. Abdomen: spleen palpable. Nervous system: no abnormal signs. The urine was very dark and gave a strongly positive guaiacum reaction, but was free from red corpuscles. Although a spectroscopic test was not performed, there can be no doubt that hæmoglobinuria—or more probably methæmoglobinuria—was present.

Course of illness.—The temperature chart showed an irregular pyrexia, varying from subnormal to 101° F. The blood count showed on Sept. 2nd:—

Red cells	1,700,000	Polymorphs ..	55%
White cells ..	28,000	Lymphocytes ..	38%
Hæmoglobin ..	28%	Monocytes ..	7%
Colour-index ..	0·82	Eosinophils ..	0

The red cells showed slight anisocytosis and polychromasia and eight nucleated forms were seen in bed-making.—Dr. H. **Trayer** had found that felsol powder gave relief in dyspnœa. For failing appetite, half a pint of hot water sipped half an hour before dinner was helpful. Brandy, sherry, or port could sometimes be allowed with advantage.

LONDON ASSOCIATION OF THE MEDICAL WOMEN'S FEDERATION

A meeting of this association was held at B.M.A. House on May 22nd, when Dr. **Lucy Wills** spoke on

Tropical Macrocytic Anæmia

Dr. Wills gave an account of her work on this subject during the last five years. In 1928 this condition was described in pregnant women under the title "pernicious anæmia of pregnancy" and was a serious cause of maternal and fœtal mortality in the large cities of India. The blood picture resembled that of true pernicious anæmia, but the condition could be distinguished from idiopathic pernicious anæmia by the following characteristics: (1) earlier age-incidence and the association with pregnancy; (2) absence of natural remissions except after delivery; (3) the presence of free hydrochloric acid in normal amounts in the gastric content of the majority of cases; (4) the absence of a raised indirect van den Bergh reaction or an increase in urinary urobilin; (5) absence of nervous involvement; (6) slight differences in the blood picture—e.g., less poikilocytosis and polychromasia, higher white cell counts. The cases were frequently febrile but no evidence could be obtained of an infective or toxic origin. The general course of the disease and the response to adequate doses of liver or liver extracts suggested a nutritional origin. Further study showed that an identical form of anæmia also occurred among men and non-pregnant women, which also supported the view that the disease was a deficiency state, the higher incidence and the greater severity in pregnant women being due to the added demands on the organism during pregnancy. A dietetic survey among the hospital classes in Bombay revealed a deplorable state of multiple deficiencies, with no significant difference in the diet of sufferers from this anæmia. All the diets were particularly low in vitamins A and C. Experiments with rats fed on diets based on those in common use among sufferers from this anæmia resulted in the production of a macrocytic anæmia, which, however, was associated with the multiplication of Bartonella organisms in the blood stream. A search for similar organisms in the patients gave negative results and large doses of vitamins A and C had no curative effect. Similar experiments with monkeys (Bartonella free) again led to the production of a macrocytic anæmia, but both in the control animals, who were receiving additional rations of vitamins A and C, and in the experimental animals. When the ration of the vitamin-B complex was increased by the addition of Marmite to the diet the anæmia disappeared rapidly. The trial of marmite in human cases was equally successful, 15–30 g. of marmite daily resulting in a maximal response and a rapid rise in the red cell count in both pregnant and non-pregnant cases. At this time Castle and his co-workers were publishing their work on the factors, intrinsic and extrinsic, necessary for the formation of the hæmopoietic factor in liver. As the tropical cases had apparently normal gastric secretion it was assumed that the intrinsic factor was present, but that the missing dietetic factor was Castle's extrinsic factor. After the publication by Dr. Wills of the results with marmite, the Boston workers tried a similar autolysed yeast extract and found that though inactive alone, when incubated with normal gastric juice it was highly active in the cure of idiopathic pernicious anæmia. These workers postulated vitamin B_2 or some factor closely associated with it as the extrinsic factor in pernicious anæmia.

At the same time Dr. Wills said further work with standardised vitamins and yeast preparation in relation to tropical macrocytic anæmia had already been started by her with the help of Miss H. Chick, D.Sc. For the test of these preparations uncomplicated cases under controlled conditions were used, and the activity of a preparation was judged by the height of the reticulocyte peak and the subsequent rate of blood regeneration. Vitamins B_1, B_2, and B_4 were inactive curatively when given in the purest available form —i.e., as acid clay and extract of egg white, or in watery yeast extract of known vitamin potency; further, preparations of marmite free from these vitamins were still active curatively. The vitamin-B complex was, therefore, excluded as the hæmopoietic factor in marmite curative in tropical macrocytic anæmia and also presumably as the extrinsic factor in pernicious anæmia. Further experiments showed that the hæmopoietic factor in marmite was heat stable and was neither precipitated nor inactivated by 80 per cent. alcohol. Whole yeast was inactive, but Dr. Wills suggested that this might be due to the fact that yeast cells are resistant to gastric digestion, rather than to the absence of the hæmopoietic factor.

She summed up the present position as follows: Tropical macrocytic anæmia is a deficiency, dyshæmopoietic anæmia due to the lack of the hæmopoietic factor in the liver known as the pernicious anæmia factor. The disease is distinct from idiopathic pernicious anæmia and is not necessarily associated with diarrhœa, defective gastric secretion, or pregnancy, other causes of macrocytic anæmia. The deficiency is, in her opinion, due to a dietetic lack in some substance present in marmite, which is not one of the known B-vitamins, but which is probably identical with the extrinsic factor described by Castle for idiopathic pernicious anæmia. The tropical anæmia is cured by the administration of the missing factor as marmite or of the pernicious anæmia factor present in liver.

Dr. **Helen Mackay** asked if there was any explanation of the absence of nervous symptoms and natural remissions and of the fact that there was no record of the disease in children, who were normally more susceptible to deficiency diseases than adults.

Dr. **Wills**, in reply, said that possibly as regards nerve changes there was not time enough for these to develop in the young patients, but it seemed more likely, in view of the age of some of the non-pregnant patients, that the nerve lesions of true pernicious anæmia were associated with the gastric lesion rather than with the absence of the hæmopoietic factor, which would explain the absence of nerve lesions in the tropical form. She thought that further study might show that remission did occur in exceptional cases, but had no explanation of the absence of recorded cases in children.

St. John's Hospital Dermatological Society.—The Prosser White oration of this society will be delivered by Dr. William Allen Pusey, of Chicago, on Wednesday, June 27th, at 5 P.M., at the house of the Royal Society of Medicine, 1, Wimpole-street, W. The title of Dr. Pusey's lecture will be "Disease, gadfly of the mind, especially the stimulus of disease in the development of the mind."

REVIEWS AND NOTICES OF BOOKS

Relief of Pain in Childbirth

By F. Neon Reynolds, M.C.O.G., F.R.C.S.E., Hon. Obstetric Surgeon to the Hospital for Women and Children, Harrow-road, and Southend General Hospital. London: Medical Publications Ltd. 1934. Pp. 114. 10*s.* 6*d.*

This book appears at an opportune moment, for the relief of pain in childbirth is now being much discussed both within and without the medical profession. Mr. Reynolds sets out the many drugs and methods advocated for the purpose and gives a judicial summing-up of their merits and demerits while clearly indicating his own preferences.

His chief objective he describes as the humane relief of pain, with consequent conservation of the strength and natural resistance of the patient. The ideal to be aimed at for the pains of the first stage is an analgesic or hypnotic that produces drowsiness, with sleep in a state of complete relaxation between uterine contractions. An inhalation anæsthetic is unsatisfactory in that it leaves the woman wakeful, awaiting with apprehension the next contraction, and making frantic efforts to inhale deeply and rapidly on the first warning of its onset. Anæsthesia deep enough to produce sleep as one pain passes off and to avoid rousing by the next involves long-continued soaking in the anæsthetic. In the expulsive stage, on the other hand, relief of pain during contractions with recovery to consciousness in the intervals is the aim, as thereby the assistance of the patient can be obtained by instruction between the pains. Hence an anæsthetic, rapidly induced and rapidly recovered from, such as nitrous oxide or chloroform, is best. As the moment of expulsion nears, the anæsthesia can be raised to the degree required to remove voluntary control, thus allowing the head to be born as and when the attendant desires; immediate cessation of further administration usually results in the delivery of the body and afterbirth by bearing-down efforts.

Drugs and methods suited to fulfil the requirements for each of these stages are fully discussed in the light of their simplicity, ease of administration, effectiveness, and after-effects on mother and fœtus. The barbiturates are dismissed as dangerous; avertin is said to have the disadvantages for routine use of variable results and of the necessity for calculating dosage and making-up the solution for each case. A rectal injection of paraldehyde in olive oil, with or without a single injection of morphine and scopolamine, is advocated because of its ease of administration, general applicability, effectiveness, and ready combination with other methods in the expulsive stage. For this later period either nitrous oxide with oxygen or chloroform is the stand-by; and the conditions favouring the use of one or the other are fully considered. The possibilities of relieving pain in the woman attended by a midwife only is discussed in an instructive chapter. Crushable capsules of chloroform are not favoured, but it is held that paraldehyde rectal injections which are usually given by the nurse or midwife when working under a doctor, if put up in containers of a single dose ready for use, could safely be left in the hands of the midwife alone and would be effective for all but the pains of the birth itself. For these, for which relief is most needed, some hints are given of what might be done by devising a form of apparatus of the Junker type, so sealed and regulated as to allow only the flow of a weak and intermittent supply of chloroform, sufficient for each pain. The author himself expresses doubt whether or no he is too optimistic in envisaging something of this kind; it is clear that in any case the method must be rendered foolproof and tested by extensive trials before being sanctioned.

The need for attention to minor troubles during pregnancy in order to obtain the confidence and coöperation of the patient is duly stressed; but no mention is made of the possibility of lessening pain and fatigue—and thus lessening the resort to drugs—by instruction of the expectant mother in the part she has to take during labour, by distracting her thoughts from fears and anxieties and by teaching her how to relax completely. Those blessed and most humane weapons, anæsthesia and the forceps, that have so much to their credit have also a debit side; for the pursuit of other means of securing easy and natural parturition has been hindered by the very fact of their ease of application and efficiency. But they should not prevent the methods, to which they are supplementary, from being tried first.

Dr. Reynolds has succeeded in the task he has set himself and his book should receive wide acceptance because of its eminently practical and judicious character. He expresses himself well and clearly, though the over-sensitive may shudder when told "to gently but firmly rub" or on finding that "forceps" is plural. He consistently spells the first syllable of scopolamine with an "a," but seems unable to make up his mind whether "primi-gravidæ" and "multiparas" should be hyphened or not or their plurals be Latin or English. There will doubtless soon be an opportunity of rubbing out these trifling blemishes. The printing is beautiful and adds much to the pleasure of reading the book.

Traité de physiologie, normale et pathologique

Tome V., Respiration. By G.-H. Roger, Honorary Professor of Physiology; and Léon Binet, Professor of Physiology in the Faculty of Medicine, Paris. Paris: Masson et Cie. 1934. Pp. 474. Fr.100.

Like its companion volumes, this book is made up of articles by various contributors. It opens with a short but valuable section on tissue respiration by Pierre Thomas, which might well have been lengthened at the expense of some less relevant and even redundant material which occurs later. The "considérations histophysiologiques" by Léon Binet which follow are instructive, drawing attention to properties other than respiratory possessed by the cells of the lung alveoli, and to the importance of the lymphoid tissue of the lung. Pulmonary ventilation is treated by the same author. This section seems rather scrappy owing to the number of subheadings such as cough, hiccough, types of respiration; the mechanics of the respiratory movements could have been developed more fully. One does not grudge the space devoted to consideration of the amount of lung tissue necessary to support life and the possibility of actual hypertrophy in the young; this is interesting and instructive, as are the pages dealing with the bronchi and pleura.

L. Dautrebande writes on gaseous exchanges in the lungs and tissues, giving perhaps a little too much space to methods and to the carotid sinus control of respiration, but finishing with an interesting section on physio-pathological conditions which includes the effects of acute and chronic affections, and a general treatment of oxygen-lack and the various factors which lead up to it. There is some repetition of this matter in the contributions of H. Hermann, C. Heymans, and L. Binet on basal metabolism, nervous control of respiration, and the physiopathology of some respiratory affections respectively. The section on nervous control is excellent, as was to be expected; basal metabolism, though it necessitates a knowledge of respiratory exchanges, and is here competently dealt with, might have been better placed than in the volume on respiration.

Apart from inevitable overlapping and discontinuity associated with a compilation of this sort—the editors have obviously refrained from any attempt to unify it—the articles themselves are good, and the footnote references which abound cover a wide and representative field. The book is generously illustrated with graphs, tracings, and pictures of apparatus (there is some repetition even here), and contains some very good histological colour plates.

Baths and Medicinal Waters of Britain and Europe

By Michael G. Foster, O.B.E., M.D. Camb., F.R.C.P. Lond. Bristol: John Wright and Sons, Ltd. 1933. Pp. vi. + 225. 12*s.* 6*d.*

The author of this book has peculiar qualifications for his task, since he worked during a long term of years on the Riviera and the Engadine in the winter and at a British spa in the summer months. He has thus been able to distinguish, as few others could do, the effects of a change of climate in a great variety of chronic illnesses from the effects of the systematic use of waters and baths. He points out that at some of the leading spas the course of treatment has "very rightly" developed into a specialty of the place. The results obtained at such spas depend as a rule upon a combination of methods, the result of much clinical adaptation, also on climate and other local characteristics. In Dr. Foster's view, however, the waters come first; some waters, for example, are held to be of definite value in vascular hypertension associated with metabolic disorders, and particular actions have been attached to sulphur waters and others to calcium and alkaline waters. Unfortunately in many spas little attention is paid to the differentiation of hydrological treatment. Another matter in which Dr. Foster's experience is welcome is in the treatment of the type of congestion of the liver met with in the tropics, which occurs even *in abstemious persons*. It is commonly supposed that a change to England is the main remedial agent, but Dr. Foster holds that the use of waters is of paramount importance. He believes also that gynæcological and cardiovascular cases and many chronic dermatoses could well be treated more specifically at the British spas. He is convinced that a large number of common chronic disorders yield to treatment at an appropriate and well-appointed spa more readily than to a mere change of climate.

In the many diseases known as rheumatic the popular name still "serenely over-rides" the transitory ætiological classifications. Rheumatic fever is only of interest to the hydrologist from the occasional value of cooling baths in hyperpyrexia. But in regard to chronic rheumatism the author wisely emphasises the thesis, too often forgotten, that the first aim of treatment should be to relieve pain. He advises a more extensive use of hot peat baths, in sciatica for example, because they remove the inhibitions of pain. When pain is allayed normal nutrition may return and adventitious deposits may be removed. A similar rule applies to rheumatoid arthritis, and baths furnish powerful means for reducing the "constant trauma" of pain. In osteo-arthritis he advocates brine baths and pools for improving the movement of the joints, and for feeble patients fango packs and local vapour baths.

Brief descriptions are given of the different kinds of waters and baths and their uses. The latter half of the book is occupied with a short survey of the principal British and European spas, founded on the work on "Climatotherapy and Balneotherapy" by Sir Hermann and Dr. Parkes Weber. To this Dr. Michael Foster has now added much new material, which makes the book a valuable and comprehensive guide in the choice of a spa.

Facies Dolorosa

Das schmerzensreiche Antlitz. By Dr. H. Killian. Leipzig: Georg Thieme. 1934. Pp. 88. M.19.60.

The title of this book does not adequately indicate its contents. It is really an attempt to illustrate the facies of disease, meaning by that not only the organic changes wrought in the face by illness but also the alterations of expression which result from the patient's mental reactions to his malady. The author presents upwards of 60 photographs illustrating different examples of disease which he arranges into nine groups under such titles as facies dolorosa, pale faces, goitres, cachexia, stupor and coma, and so forth. As he is himself a surgeon most of the pictures are naturally of surgical conditions. The artistic excellence and beauty of reproduction of the photographs deserve high praise, but the general effect of glancing through them is one of disappointment. Few of the different sorts of facies depicted are really "typical" of anything, for the fact is that not many diseases have a distinctive facies. The absence of colour also in a photograph interferes greatly with the display of some of the most characteristic changes effected by disease.

A Synopsis of Hygiene

By E. W. Caryl Thomas, M.D., B.Sc., D.P.H., Barrister-at-Law; Medical Officer of Health, Dagenham. Bristol: John Wright and Sons, Ltd. 1934. Pp. 283. 10*s.* 6*d.*

This book, intended for medical students, contains a large amount of information, most of it in summary form. The writer is modern in his outlook and, on the whole, accurate in his facts. The only part which is open to serious criticism is Chapter III., which deals with vital statistics. It is doubtful whether it is worth while trying to convey to medical students the significance of so many statistical terms, but if it is to be done those paragraphs which deal with estimates of the population according to a geometrical progression (not now, by the way, the "method of the Registrar-General"), with the calculation of a standardised death-rate, with the meaning commonly applied to the comparative mortality figure, and with the definition of the infant mortality-rate should be revised in any subsequent edition. For those who can absorb information in a concentrated form the book should be invaluable.

EUGENICS IN PRACTICE

A Series of Essays suggested by the Report of the Brock Committee

IV.—THE CALIFORNIAN EXPERIENCE

AMERICAN experience of legal sterilisation ought to provide exact material for study. Sterilisation laws now exist in 26 States in the Union, and in four others—New York, New Jersey, Nevada, and North Carolina—similar laws have ceased to be operative. Up to Jan. 1st, 1933, a total of 16,066 operations had been performed under these laws, of which 8504, or 53 per cent., were done in California. During the calendar year 1933 a further 578 sterilisations were done in California, not including operation by private physicians on individuals at their own request. In the view of the Brock Committee no entirely independent review of the Californian results has been attempted, and they find it significant that the parole-rate in Californian institutions is equalled by the parole-rate in a large mental deficiency colony in a State which had no sterilisation law. The committee consider that, while there is no evidence of harm done by sterilisation, nothing practical has really been done either. The argument cuts both ways, however, for if it is agreed, as it should be, that sterilisation is not a substitute for institutional care where this is necessary, the limited parole-rate in California may simply indicate that this principle was being upheld.

The Californian statistics refer entirely to sterilisation of the insane and feeble-minded. These patients represent only a small proportion of the group for whom the Brock Committee recommend sterilisation as an appropriate measure, and it would be unfair to judge the merits or demerits of voluntary sterilisation solely in terms of its application to people suffering from mental disabilities.

THE INTENTION

Between 1927 and 1930, under the auspices of the Human Betterment Foundation, the available Californian evidence was published in the form of a series of papers to various medical and technical journals, and in 1930 these 26 papers were collected and published in book form.[1] In California the first sterilisation statute was adopted in 1909; a new law repealing the old one was enacted in 1913 and amended in 1917. The present law provides for the sterilisation, with or without consent, of "any person who has been lawfully committed to any State hospital for the insane or the Sonoma State Home, and who is afflicted with mental disease which may have been inherited and is likely to be transmitted to descendants, the various grades of feeble-mindedness, those suffering from perversion or marked departure from normal mentality or from disease of a syphilitic nature." These rather formidable provisions are modified in practice by the fact that the consent of the patient's relatives is always sought and usually gained before the operation is performed; not one operation in ten, we are told, is performed against the wishes of the relatives, and probably the proportion is really lower. The Act is complicated by penal and therapeutic provisions which might be expected to prejudice its success as a eugenic measure. For example, whenever in the opinion of prescribed officials sterilisation will be beneficial to the physical, mental, or moral condition of certain recidivists in the State prisons, who are also moral or sexual degenerates or perverts, they may order the operation; and the Californian penal code provides for the sterilisation as "additional punishment" of any person adjudged guilty of carnal abuse of a female under the age of 10. Parents might well refuse to consent to a measure which had such penal associations.

There has been a steady increase in voluntary sterilisation in the State, so that in practice this prejudice does not appear to tell very heavily against the success of the Act from the eugenic standpoint. For obvious reasons, however, the extent of such prejudice cannot be estimated, and it is impossible to judge whether it has interfered much with the ascertainment of cases. The element of compulsion in the Act, though used with discretion, may also tend to "drive defect underground," to use the phrase of the Brock Committee. Compulsion, as they pointed out, is likely to defeat itself, for if public opinion is favourable, compulsion is unnecessary, and if public opinion is indifferent, compulsion may convert indifference into hostility.

The aim of the Californian, as of other sterilisation laws, has been to protect the State from the propagation of defective or insane stock, and to stabilise those who, apart from the chance of reproducing their kind, are fitted to take part in community life. Most of the sterilising operations performed in California since the passing of the original Act have been upon insane people in the State mental hospitals; only about one-fifth have been performed on mentally defective patients. At the Sonoma State Home for mental defectives, however, it is now the rule that no patient shall leave the home, even for a short holiday, unless sterilised. In a paper published in 1927 Mr. Paul Popenoe, the very active secretary of the Human Betterment Foundation, estimated that 8·12 per cent., or 1 in 12, of the patients admitted to Californian State mental hospitals had been sterilised since the first law was passed in 1909. Up to June, 1926, 1054 sterilising operations had been performed on mental defectives in the Sonoma State Home. Of the sterilised insane, 47 per cent. of the men and 29 per cent. of the women were still under institutional care; the corresponding figures for defectives were 34 per cent. of the men and 28 per cent. of the women. The Brock Committee regards this aspect of the Californian experiment as profoundly unsatisfactory; they can find no justification for sterilising defectives who are unfit for community life.

THE RESULTS

Opponents of eugenic sterilisation usually fear that promiscuity will be increased among the sterilised with consequent spread of venereal disease; they sometimes suggest that sterilisation may cause physical disability to the patient.

The operations performed in California have been vasectomy in the male and salpingectomy in the female. There is little evidence that these measures have produced physical disability in the patient. We are told that "of 89 mentally defective women questioned after salpingectomy at the Sonoma State Home, 70 reported no change in libido, 12 a decrease, 7 an increase. The group which claimed a decrease was more intelligent than the average." It is, of course, important to know whether these patients had been on parole before they were questioned, and, if so, whether they had had adequate opportunity to estimate any change in their libido. This point is not made quite clear in Mr. Popenoe's account. He seems to imply that the women questioned had been on parole and that some of them were married, but there is no definite statement to that effect. He points out, moreover, that the testimony of mentally defective women was not the best evidence on which to base a sound conclusion. Many of them had been sexually delinquent before admission and would therefore be anxious to convince the staff that they were not likely to become sex offenders in the future, and would be inclined therefore to represent themselves as less highly sexed than on admission.

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[1] Collected Papers on Eugenic Sterilization in California, 1930. The Human Betterment Foundation, Pasadena, California.

Of 36 men committed to the Californian State hospitals for mental disease, 22 noticed no change in their sexual life after vasectomy, 9 reported an increase of sexual activity, and 5 a decrease. None of them experienced any distension or pain in the scrotum following the operation. In this case the information was obtained by sending a questionnaire to patients discharged from the State mental hospitals. As the psychoses affect the sexual life of the patient, recovery from a psychotic state would be likely to lead to a change in libido; so that this evidence is not above criticism. Of a group of 65 normal men upon whom vasectomy had been performed by their own wish, 9 reported that libido was greater than before, 45 that there was no change, and 2 that libido was decreased, and their statements probably deserve to be taken at face value.

Among the cases followed up, there was no evidence that sterilisation had any influence on the failure of patients on parole. Of those patients paroled, about whom information was available, 73 per cent. of the boys were successful and 65 per cent. of the girls. Success was taken as meaning that the interests of society were as well protected as if the patient had remained in the home. In a series of 107 boys on parole, 78 were successful, 1 doubtful, and 28 unsuccessful. Only 9 of the failures showed criminal tendencies, and in 1 alone—an exhibitionist—was there any sexual element. In a series of 304 girls on parole, 189 were successful, 18 doubtful, and 97 unsuccessful. Altogether there were 25 cases (8 per cent.) of sexual delinquency in the series. That is to say, 1 girl in 12 became sexually delinquent when released on parole; but it must be noted that 9 out of 12 of these girls had been sexually delinquent before sterilisation and that the figures showing success on parole compared favourably with those of institutions of other States where sterilisation was not practised. Out of 2000 feeble-minded insane women sterilised, five or six were reported to consider their infertility an asset because it freed promiscuity from the fear of pregnancy. Others, of course, may have said nothing and thought the more. No instance of the kind was reported among 3000 sterilised men, but since society regards the unmarried father more indulgently than the unmarried mother, male patients were presumably indifferent about this point.

The evidence of probation officers who had had the opportunity of observing large numbers of paroled patients over a period of years indicates that sterilisation has not increased the amount of promiscuity but has tended to diminish it, and that the chances of spread of venereal disease have decreased to a corresponding degree.

MARRIAGE AFTER STERILISATION

In one respect sterilisation has been decidedly successful. The marriage of an unsterilised defective patient can only be regarded as a catastrophe to the State, since it is idle to expect a mentally defective person to practise birth control successfully or to exercise self discipline. Many sterilised defectives who marry, however, become more stable and live happy competent lives. This is especially true of the women who, in the Californian experiment, were found to be highly sexed and anxious for marriage; the feeble-minded men, on the other hand, were undersexed and lacking in attraction. Among 129 sterilised patients leaving the Sonoma State Home there were 136 marriages (several patients having married twice). In all except five cases the persons marrying were women. No recent information was available about 29 of the marriages of women, but two-thirds of the remaining marriages were successful—a proportion which is thought to correspond with the average successful marriage-rate in California.

The marriage-rate among insane patients was found to be considerably below that of the general population at all ages. Though the male patients married at all times, the female marriage-rate remained almost constant after the age of 30. In general, it was found that no large group of institutional insane in California would produce enough children wholly to reproduce themselves even if the members of the group were all unsterilised. No comparable statement of the fecundity of the feeble-minded is included, but it is said that among 25 girls successful on parole and now occupied in the management of their own homes, 11 have a total of 45 living children which they had borne, legitimately or otherwise, before sterilisation. This suggests that fecundity was high in the feeble-minded group and that sterilisation has enabled some girls to be released who would otherwise have needed segregation.

THE LONG AND THE SHORT OF IT

Most patients and their relatives appear to be pleased with the results of the operation; out of a series of 173 patients, 132 were satisfied and 22 indifferent; 19 expressed dissatisfaction, of whom only 1 is said to have offered a cogent reason. "In a steadily increasing number of cases," we are told, "the relatives urge sterilisation, or send the patient primarily for that purpose."

But Californian experience is by no means overwhelming evidence in favour of sterilisation. If the insane ordinarily propagate too little to increase the size of their group, and if the parole-rate of mentally defective patients cannot be increased as a result of sterilisation, it looks at first sight as though nothing much had been achieved. The gain, however, though small is positive; for if the birth of even a small number of defective children, or children with a psychopathic tendency has been prevented, it is an advantage. Furthermore, individual patients have undoubtedly benefited by the operation—notably, those women who have married successfully but who would otherwise have had to spend their lives under institutional care. The latest report of the Foundation (Feb. 13th, 1934) suggests that medical officers, probation and parole officers, and social workers are all well satisfied with the operation of the law. Mr. E. S. Gosney, who was responsible for the Californian investigation, sums up the position in the preface to the Collected Papers by saying that sterilisation is not a short cut to any eugenic millennium, but is an invaluable supplement to the recognised protective measures.

THE Marquess of Bath recently opened a new wing of the Bridgwater Hospital. Extensions include a new casualty department, ear, nose, and throat, and ophthalmic departments, a new lecture room for nurses, new private wards and adequate sleeping accommodation for night nurses. The cost has been £11,000.

THE LANCET

LONDON: SATURDAY, JUNE 2, 1934

DEATH AND DAMAGES

THE Lord Chancellor's Law Reform (Miscellaneous Provisions) Bill, designed to remove legal anomalies and uncertainties in the recovery of damages where one of the parties has died, has a special application to claims arising out of road traffic casualties. It proposes to abolish certain recognised injustices, yet apparently it will not take the opportunity to give a much-needed remedy to the hospitals and the medical profession. The origin of this new effort towards law reform is the curious survival of a legal maxim apparently peculiar to the English legal system—namely, the doctrine that a personal action dies with the person. The effect of the maxim has been alleviated by judicial decisions and by statute, and its application to claims based on contracts is incomplete. So far as claims for damages for negligent driving are concerned, the maxim means that the victim of a collision is debarred from all remedy if the negligent motorist dies. It follows that the liability of insurance companies under third-party-risk policies comes to an end with the defendant's death and the principle of compulsory insurance is defeated. Conversely, if it is the victim of the motorist's negligence who dies, his children are prejudiced at present in their effort to obtain damages. It is true that, if the father has been killed, they have a special remedy under the Fatal Accidents Act of 1846, commonly called Lord Campbell's Act; but this statutory remedy is not available for adopted or illegitimate children, nor does it cover medical or funeral expenses. Such are the admitted anomalies for which the Lord Chancellor invited the Law Revision Committee to find a cure.

The distinguished lawyers who form the Committee lately presented a report (Cmd. 4540, H.M. Stationery Office. 2*d*.) and their recommendations were embodied in a Bill which has already been approved by the House of Lords. If the Bill becomes law, death will no longer be a bar to legal claims; all causes of action (except claims for defamation or seduction) on which the dead man might have sued or been sued will survive for or against the benefit of his estate. Nevertheless a notable limitation is to be allowed to remain. If anyone dies as the result of a motorist's carelessness, the dead man's estate will be able to recover only the funeral expenses and certain out-of-pocket payments incurred before death. It will still not be possible to obtain damages for the general loss caused by the death or for the mental and bodily suffering which preceded death. This limitation was officially explained during debate in the House of Lords as being due to the difficulty of calculating the loss or putting a figure upon the suffering. Supposing, said the Lord Chancellor, it was a celebrated surgeon who was killed: it would be hard to assess the loss which his death inflicted upon his estate. To laymen this explanatory argument may sound unconvincing. They are probably aware that, if the celebrated surgeon was merely crippled and not killed by the accident, a jury would be expected to fix the damages due to his enforced inability to continue his practice. Laymen may also be surprised that the Bill proposes to allow funeral expenses to be recovered in such cases but not the expenses of medical or hospital treatment. There is no difficulty in ascertaining medical fees or hospital payments if a patient is alive; why is there to be any difficulty when the patient dies? If the estate of the victim of a fatal motoring accident is to be entitled to recover the funeral expenses from the negligent motorist, why should not the latter also pay the doctor and the hospital as well as the undertaker? Why does the law once more leave the doctor and the hospital to bear the loss?

RADIOGRAPHY OF THE MASTOID IN ACUTE OTITIS

THE indications for operation in suppuration of the middle ear are a perennial source of interest to general practitioners as well as to otologists. Prof. HUGO FREY, in a lecture reported in the *Journal* of the American Medical Association of Vienna,[1] makes some wise comments on the factors which have to be considered. Apart from the very mild cases which do not go on to suppuration, acute otitis is always characterised by a purulent inflammatory process of the mucous membrane which affects not only the mucosa of the tympanic cavity, but the coating of all the other spaces of the middle ear—namely, the Eustachian tube, attic, antrum, and mastoid cells. In most cases the inflammation becomes severe in the first few days after the onset, and spontaneous perforation of the drum membrane does not usually occur until the fourth or fifth day; in such cases it is advisable to incise the membrane as early as possible, since the slight operation not only brings about a more rapid disappearance of the pain and the fever, but doubtless also has a good effect on the intensity of the process. It is important to remember that there are forms of acute otitis in infants in which the temperature is almost the only symptom, and otoscopic examination shows only minimal changes; but in these cases also paracentesis must be performed.

This acute inflammation usually subsides after three or four weeks, and operation is therefore not necessary for the cure of an otitis confined to the mucosa, but only when the process of inflammation spreads to the underlying bone. The usual clinical indication for operation is when, generally about the third or fourth week and after the temperature and pain have disappeared, they set in again; tenderness over the mastoid, which is nearly always present at the beginning of an otitis, comes on again, and the posterior wall of the auditory meatus sinks. Fluctuation over the mastoid is no longer waited for to-day; but in young children, in whom the petro-squamous suture is still open, we are sometimes surprised by the appearance of a retro-auricular abscess. However, the development of an abscess in the mastoid process is not always accompanied by such acute symptoms; there may often be fairly extensive destruction of bone without high temperature or severe pains. Clinically, such a condition can be diagnosed when an acute otitis is not completely cured in the course of four or at the most five weeks. The secretion may continue, if only very slightly, and when there is still a pressure sensitiveness, no matter how slight, at the root or the tip of the mastoid process, abscess must be suspected; it may indeed be present even in cases where there is no longer discharge but the drum membrane is not entirely normal and, which is very important, the hearing capacity has not been satisfactorily restored. The severe intracranial complications may appear even in the first few days in the so-called malignant form of acute otitis, and in such cases surgical intervention is necessary at the very beginning.

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[1] Ars Medici, 1934, No. 3, p. 99.

The indication for operation in acute otitis can be supported by X ray examination of the bone, but it requires special practice and experience to make correct pictures of the ear, and also to be able to interpret them. The following points are mentioned by **Frey**: a veiling or shadowing of the mastoid cells does not mean that an abscess is present, for this may also be seen in cases of uncomplicated otitis, since the mucous membrane of the cells is always involved in the inflammatory process. It is an entirely different matter when the septa between the cells disappear or become indistinct, for a destructive process can then be assumed with certainty. It is always absolutely necessary to prepare comparative pictures of the healthy side, and in doubtful cases it is advisable to repeat the examination, for this is the best way of recognising a progressive process. In any case, an X ray picture taken before operation gives information as to the extent and form of the pneumatic system and the topography of the adjacent cranial fossæ.

Dr. P. **Cottenot**, of Brussels, recently described[2] the positions which he recommends for radiography of the mastoid. He agrees with Prof. **Frey** that a comparison with the opposite side is essential, that a shadowing with diminution of the transparency of the mastoid cells is to be found in simple acute otitis without clinical signs of mastoid involvement, but that a mastoid focus can be diagnosed when destruction of the intercellular septa is seen. A skiagram of the mastoid is of no diagnostic value unless it shows the details of these septa, which are very delicate and often only slightly visible; such a picture should be sufficiently clear and fine to be examined through a lens. Here more than anywhere in the body the results of radiography must only be interpreted in conjunction with the clinical findings. Dr. R. **Thienpont**, of Antwerp, comes to similar conclusions.[3] In addition, he believes with **Wittmaack** that the course of an acute otitis is peculiarly influenced by the form of pneumatisation of the mastoid process, and that radiography, by showing this, has its principal value in prognosis. According to this theory, a normal or "mesoplastic" mucosa, with complete and regular pneumatisation, is rarely attacked by acute inflammation. Three degrees of hyperplasia of the mucosa are distinguished: (*a*) a highly hyperplastic mucous membrane with complete arrest of pneumatisation is likewise rarely attacked; (*b*) a moderate degree of hyperplasia with partial arrest of pneumatisation is particularly predisposed to acute inflammation; and (*c*) in the slightest degrees of hyperplasia there is but very little tendency to inflammation. A condition of hypoplasia can also influence the acute inflammatory process; thus, the most advanced degrees of fibrosis, often the result of previous inflammation, are not easily infected, but the less extreme hypoplasias do not always escape. Dr. **Thienpont** holds that these various conditions may be recognised by radiography, and that valuable aid to prognosis can thus be given; but it cannot yet be said that his postulates have been proved.

HEALTH INSURANCE AS "SOCIALISED MEDICINE"

The American Medical Association at their annual meeting in Cleveland, Ohio, on June 11th–15th will give special consideration to the question of introducing some form of compulsory health insurance into the United States. Hitherto the Association have strongly opposed health insurance, regarding it as a form of "socialised medicine," even where insurance medical services are provided through the panel system, and therefore repugnant to the rugged individualism of the American people; and any attempts to discuss the subject at the annual meetings have been, if not actually burked, at all events not encouraged. There are now unmistakable signs that the rank and file of the profession are dissatisfied with this way of dealing with so important an issue, and a lively discussion may be anticipated at the Cleveland meeting. For the purposes of the discussion the association's bureau of medical economics has prepared an elaborate report on "The Insurance Principle in the Practice of Medicine," which purports to set out the effects of health insurance on medical practice in Europe. The report, though written with outstanding ability, is, on the whole, a disappointing document. One naturally expects documents written by Americans for Americans to be before all things up to date; and this report, admirable in many respects, is certainly not up to date; it is almost wholly given up to criticisms of the oldest health insurance system in Europe—namely, the German—which from the insurance doctor's point of view is also the most unsatisfactory.

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[2] Paris Médical, Feb. 3rd, 1934, p. 95.

[3] Bruxelles-Médical, March 18th, 1934, p. 641.

The defects of the German system were well known to the medical profession of this country 25 years ago, and it was to prevent the introduction of those defects into the British insurance system that the British Medical Association entered upon their campaign of the "Six Cardinal Points." The points embodied certain basic principles of insurance medical practice for which the German doctors have for 50 years striven unsuccessfully to secure: separation of medical services from cash benefit administration, statutory right of every doctor to undertake insurance practice, free choice of doctor, selection by local doctors of the local method of medical remuneration, effective participation of doctors in the central and local administration of the system. Medical benefit in the British system has been based on these principles since its inception 22 years ago, and with the introduction of the system health insurance entered upon a new phase; in countries that have since adopted compulsory insurance—France, for example—the doctors have profited by the experience of their British colleagues. At this time of day it is unnecessary to concentrate attention on the German system. It is by an open-minded study of the British system that an inquirer may most readily appreciate the issues involved in the introduction of compulsory health insurance; and it is surprising that the American Medical Association, in a document prepared to furnish the facts most material to the forthcoming discussion, should have dealt so inadequately with what the British doctors have done to place insurance practice on a satisfactory basis. The statements that are made are so brief that some are misleading or inaccurate; it is said, for example, that "confinements" are among the services provided, whereas attendance on a confinement is expressly excluded from the panel doctor's duties—an important point to bear in mind when considering the amount of his remuneration.

We hope that the American Medical Association will supplement their studies in German health insurance by giving some attention to what has been done in this country to bring insurance practice into harmony with the true traditions of the medical profession. After all the Briton is as full of "rugged individualism" as his American cousin, and the spirit that took the *Mayflower* across the Atlantic still lives in the old country, to the irritation of a certain reforming type. Our insurance system was not imposed upon us by a dictator, but freely accepted as a valuable measure of social reform, and in developing the system there is no terror of "socialised medicine," which may mean anything or nothing according to what is in the minds of those who use the phrase.

X RAY DIAGNOSIS OF LOBAR PNEUMONIA

THE importance of radiography in the diagnosis of chronic thoracic disease is now generally recognised and a radiogram is rightly regarded as an essential part of every complete investigation of the chest. Its application to the diagnosis of acute disease has been limited by the difficulty of adapting apparatus suitable for chest work to use at the bedside. In some acute diseases, such as pulmonary abscess or empyema, the slight risk involved in moving the patient from ward to X ray department is so much less than those of a hesitating diagnosis that the lesser of two evils has always been rightly preferred. The portable X ray unit, which enables the physician to obtain a picture of the patient's chest with less strain to the sufferer than is entailed by a physical examination, should facilitate still further the investigation of these types of disease, and even apply to conditions such as pneumonia in which the removal of the patient from his bed entails unjustifiable risks. The provision of a portable set will ease the burden of responsibility resting upon the physician who has had to depend upon physical signs alone to determine whether the patient is suffering from a simple pneumonia or one complicated by sepsis within or without the lung parenchyma. The importance of such early diagnosis in pneumonia has become much more evident since the introduction of Felton's serum. Radiography may also be expected to tell us something of the manner in which pneumonia commences, develops, and resolves.

Interest thus attaches to a series of 40 cases of pneumonia which have been kept under radiological observation at Chicago during the course of the disease. In reporting these[1] the authors have endeavoured to correlate X ray findings with deductions based on the results of physical examinations. Experience gained in recent years from the radiographic study of chronic disease prepares us to anticipate their first and, from the practical point of view, their most important finding. None of the skiagrams taken later than 24 hours after the onset of symptoms failed to show abnormal shadows in the lungs, although at this early stage of the disease abnormal physical signs might be lacking or so slight as to be difficult of interpretation. Further, X rays proved to be more accurate than physical signs in determining the extent of disease until the stage of maximum consolidation was reached, when both methods proved equally trustworthy. The cause for this discrepancy is to be sought in the site of the original pneumonic focus which is generally deeply situated. Lesions so placed may be entirely beyond the reach of percussion and auscultation, as radiograms of tuberculous chests have abundantly proved. A consideration of symptoms and the result of X ray examination may thus enable a diagnosis of pneumonia to be made with some confidence at a stage when neither impaired percussion note, bronchial breathing, nor hair crepitation can be demonstrated.

It must not, however, be supposed that a radiogram of a pneumonic lung will provide a characteristic picture diagnostic of the condition without regard to symptoms or to the patient's general condition, in the way that a skiagram of a chest may supply conclusive evidence of phthisis without reference to history or symptoms or physical signs. There is, for example, little to distinguish the shadow of a consolidated upper lobe in an acute pneumococcal infection from the shadow cast by an epituberculous lesion of a lung. Radiology has further demonstrated the entity of a variety of pneumonia, or at any rate of pulmonary consolidation, which is unaccompanied by symptoms of acute disease or respiratory distress, and is indeed not seldom discovered during the routine examination of the chest of a catarrhal child. Again, an atelectatic lung may be indistinguishable from a pneumonic lung if X ray appearances are alone taken into account. This condition has indeed been held by some to be an essential feature in pneumonia, but no evidence of atelectasis was discovered in any of the cases under review. A slight degree of mediastinal displacement towards the affected side was, however, noted in some instances, though more commonly a slight elevation of the diaphragm was evident. Such changes are evidently necessary to compensate the diminished expansibility of the partially consolidated lung.

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[1] Graeser, J. B., Ching Wu, and Robertson, O. H.: Arch. Internal Med., February, 1934, p. 249.

ANNOTATIONS

DENTAL CARIES AND ORAL HYGIENE

In an address from the chair at the final session of the third Dental Board appointed under the 1921 Act, Sir Francis Acland said that the most important piece of investigation on the medical side was that which had recently been concluded by Mrs. Mellanby. It was very difficult for any layman, and perhaps for anyone, he said, to give an account of this work, which would at the same time do it justice and satisfy all those interested in the problems investigated, but he would attempt some observations on the subject if only to draw attention to the great importance of the work. Mrs. Mellanby had shown without doubt that teeth of good structure could be produced in certain animals by the administration of a dietary having a low cereal content but rich in vitamin D. Her more recent investigations had shown, in his opinion, that similar results could be produced in human beings. She claimed also that defective structure due to unsuitable dietary and caries in human beings went hand in hand. "I believe," said Sir Francis, "there is strong evidence for this already, and that further evidence will establish it. The question will, however, remain as to the importance of environment as compared with structure, and it will appear to many that in the present state of our knowledge Mrs. Mellanby may be going rather too far when she states that factors other than structure 'may play a part, although a secondary part, in the onset and prevalence of the disease.' We have not, I think, yet sufficient facts for the full elucidation of this problem. There was, for instance, during the investigations conducted upon the effects of different dietaries on children, a considerable increase in the number of carious teeth in the children receiving the dietary which Mrs. Mellanby would recommend, and on this her comment, which I believe to be probably true, would probably be that the special dietary was not started early enough, and should have been applied during the antenatal period and infancy. Further investigation may establish the fact that caries-proof structure can be built up in this way, but the difficulty of securing the right dietary throughout the whole period of tooth formation will, I think, make it unwise to relegate oral hygeine to a definitely inferior position. Its practice, hitherto, as Mrs. Mellanby quite truly says, has not resulted in any marked decline in caries, despite all that has been talked and written about the subject. But this may be due rather to the incomplete way in which the teaching has been applied than to error in the teaching itself. I, for instance, do not find it easy to finish my meals with detergent substances, and I cannot persuade myself that it is not useful to remove from the teeth with a toothbrush that which adheres to them as the result of meals. It would be useful, it seems to me, if it were possible alongside of a more complete experiment which would probably more completely establish Mrs. Mellanby's conclusions as to the importance of diet in structure, to conduct also more complete experiments than any which I believe have yet been possible upon the effects of perfect environment, apart from attention to diet. These comments are not in any way meant to throw any doubt upon the very high value of Mrs. Mellanby's work; on the contrary, I believe that it marks a very great advance towards a final conclusion. It challenges, and rightly challenges, some hitherto prevalent theories, and it must be the basis of all further work on the subject."

HOUSING, POVERTY, AND MORTALITY

The Registrar-General's annual review of the statistics of England and Wales shows year by year that as we move northwards the rate of mortality progressively increases. This relatively unfavourable mortality experience of the north is apparent in each type of administrative area—county borough, urban district, and rural district—and is most distinct in the early years of life, especially the second year. It is not difficult to suggest a number of natural and acquired characters of the more northern areas that may have a bearing upon the greater mortality risk—e.g., colder climate, smoky environment, occupational risks, density of population, and (perhaps) harder economic conditions. The difficulty lies in determining the actual importance of each such factor and in measuring the contribution they individually make to the excess in mortality. A very interesting study of the data has been made by Dr. Percy Stocks in a paper read before the epidemiological section of the Royal Society of Medicine on May 25th. He first notes that if we divide up Great Britain into successive zones of latitude (omitting London), then as we move northwards there is a progressive increase in the mean density per room until the Scottish industrial area is reached, where the density is 86 per cent. in excess of that in the southernmost zone. By statistical means he disentangles the influence of the two factors, latitude and density, and concludes that at ages over 5 there is no reason to suppose that mortality from all causes combined is appreciably affected by climatic differences dependent upon latitude within the limits of England and Wales. The mortality of young children from respiratory disease, however, does show an increase in passing from the south coast to the industrial north, as much as 42 per cent., even after allowance has been made for the effects of the increasing density and crowding per room. Similar, though slighter, changes were observed in infant mortality from causes not congenital, which may be presumed to be due also to the respiratory diseases which form the bulk of these deaths. An analysis of the sunshine records derived from stations in the different latitudes leads Dr. Stocks to advance the belief that these special effects of geographical area upon the mortality of young children are the result of diminished sunshine, which, leading to rickets, lowers resistance to respiratory and other infections.

Apart from this he finds no evidence that the differences in average mortality experiences between different parts of Great Britain can be ascribed to climate, and he turns to a more detailed analysis of the influence of density as measured by persons per acre and persons per room. The latter, he finds, shows the closer association with mortality; in fact up to middle life the importance of crowding per room appears to be almost double that of density per acre. The largest increase in mortality as overcrowding increases is found at ages 1–5, so that it is in these early years that the greatest benefit from improved housing may be looked for; the differences diminish but are still appreciable at the school ages, expand again for young adult females, and then steadily decline with advancing age. To what extent this association of mortality with density per room is due to overcrowding per se is a question of obvious importance, but not one to which a satisfactory answer can be given. Some believe that social selection plays a part, the less fit through their lower earning capacity gravitating to the most crowded houses. Overcrowding is certainly highly correlated with poverty, but it is Dr. Stocks's belief that the whole explanation of the excessive death-rate in the more densely occupied areas is not to be found in economic differences. The disease most likely to react to privation and overcrowding is phthisis, which many workers have shown to be particularly sensitive to social conditions. This association between tuberculosis and poverty has been made the subject of study in the second bulletin issued by the Committee against Malnutrition,[1] where special attention is given to the effects of the present economic depression.

In this bulletin the death-rates from respiratory tuberculosis are compared between the aggregate of 16 specially depressed county boroughs and the remainder of the county boroughs of England and Wales. In the former the mortality has declined between 1925–27 and 1930–32 by 5·1 per cent., in the latter by 9·0 per cent., so that in the more recent years the depressed boroughs were in a relatively more unfavourable position. On the other hand it must be noted that all the towns in this group except one showed an absolute decline in phthisis mortality, though in three the improvement is very slight. These results can hardly be taken as more than suggestive, since crude death-rates are utilised, and it is well known that the decline in mortality from phthisis has affected differentially the various age-groups and the two sexes; further, the method of aggregating the depressed towns may give undue weight to the movements in the larger components and disguise the change in the smaller towns. A much more detailed analysis is essential before we can accept the committee's conclusion (based also upon the reports of various medical officers) that "danger signals have appeared, even in England and Wales, indicating that, in not inconsiderable areas of the country, underfeeding or the other accompaniments of poverty have become sufficient to constitute an insidious danger to public health by influencing the morbidity and mortality of this disease." There appears to be more justification for the deduction from the class inequality of tuberculosis mortality, that the creation of a generally more favourable social background might significantly increase the rate of decline in the death-rate without any further advance in therapeutic knowledge—though the possibility of heritable factors contributing to class differentiation must not be overlooked.

NATURAL PERFUMES

We have received the following notes on the manufacture of natural perfumes, and the writer desires to express his indebtedness to M. J. Henri Moutet, of Grasse, through whose courtesy he had the opportunity of seeing in operation the processes which he describes, and so learnt much as to the methods of an interesting industry which at this particular season of the year is at full blast. He writes:—

"The ancient art of the perfumer still flourishes at Grasse and in the surrounding district. Here the odoriferous principles of plants grown in the neighbourhood are extracted either by steam distillation, extraction direct by solvents, or for the more delicately perfumed ones the old pomade or enfleurage process is employed. Under this process the functional activity of such flowers as jasmine, jonquil, tuberose, and mignonette goes on while they are packed between glazed frames supporting films of beef fat or lard, or on cotton fabric impregnated with olive or mineral oil. The absorption by the fat or oil during the period of exposure yields from six to twelve times the amount of perfume obtained by other processes, and of a finer quality. This, it may be supposed, is due to the continued production of perfume by the plant which is not killed, as in other processes by a high temperature or chemical poisons. Great care is taken to use fats and oils so prepared as to have no bad odour and not to develop rancidity when stored for years. The pomades thus obtained may be used as such for perfuming fatty preparations or may be stored until an 'extrait aux fleurs' is required, when they are extracted with strong alcohol, any dissolved oil is frozen out at a temperature much below 0° C. If the concentrated perfume is required the alcohol is distilled off under reduced pressure, thus avoiding the possible destructive action of heat.

"Distillation in a current of steam from an alembic is used for roots, trunks, branches, bark, previously torn up or reduced to sawdust, for leaves, flowers, and berries which are sometimes crushed first. A variant of the enfleurage process is used for violet flowers (Parma and Victoria), rose de mai, orange flower, and cassia. In this the flowers are digested for an appropriate period in purified fat or oil raised to 60–70° C.; when extraction is considered complete the molten pomade is separated from water liberated during the process and the marc is subjected to hydraulic pressure to remove the last of the pomade from the residual tissues. Extraction by volatile solvents is also used, the most commonly used being petroleum ether of low boiling point (40–50° C.) and almost odourless. The substances to be extracted are lixiviated at ordinary temperature by the solvent, which is then evaporated, leaving 'cires parfumees' which yield cloudy solutions with alcohol and may be purified by freezing and filtration, yielding liquid 'essences absolus.' An intermediate solid product is known as 'essence concrete.'

"Among the plants or their parts which are grown in the Alpes maritimes, the Var, or neighbouring departments, and are treated at Grasse, are: aspic (spikenard), angelica, basilique (basil), camomile, céleri, ciste (rock rose), cypres, estragon (tarragon), fenouil (fennel), genièvre (juniper), geranium, hysope, marjolaine (marjoram), menthe (mint), melisse (balm), oranger feuilles, oranger fleurs, persil (parsley), romarin (rosemary), rose, sabine (savin), sauge (sage), serpolet (wild thyme), tanaise (tansy), chèvrefeuille (honeysuckle), freesia, genêt (broom), jacinthe (hyacinth), jasmin, jonquille, lavande, lys, magnolia, mimosa, mousse de chêne (which is literally oak moss and is recognisable as a much used scent base), muguet (lily of the valley), narcisse, œillet (carnation), reseda (mignonette), rose de Mai, tuberose, violet flowers and leaves. The names of these are mostly obvious, but Neroli, which is an orange scent, is called after its inventor; patchouli is distilled from the dried leaves of pogostemon patchouli, a member of the great scent-bearing order labiacæ, a plant cultivated in the Straits Settlements, Penang, Java, and other tropical places. Owing to adulteration of the Asiatic product the dried leaves are sent to Europe and distilled at Grasse. Cuscus grass (andropogon muricatus) yields ' vetiver ' from its roots, although the leaves are almost odourless, and is imported from India.

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[1] Published by the committee from 19c, Eagle-street, W.C. 1, May, 1934.

"All the products mentioned are prepared at Grasse from natural sources, which are considered to yield finer perfumes than can be obtained synthetically—in fact, the use of synthetic bodies alone is unusual in the production of high-class perfumery. Most natural perfumes seem to be mixtures of several compounds, products of the vital processes of plants. Although the ketone ionone (usually a mixture of the α and β ketones) is known as artificial violet, it —or its two constituents—is usually mixed with many other artificial and natural odoriferous products in making violet perfumes. It is even doubtful whether this or other synthetic odoriferous compounds actually occur in the plants whose odours are simulated. Their use in many cases is mainly as carriers for the more delicate natural product."

It is evident that there are directions in which the effortless syntheses of living cells hold their own easily against the more violent methods of the laboratory.

CONTROL OF COMMON INFECTIOUS DISEASES

THE current methods of control of the common infectious diseases—scarlet fever, diphtheria, measles, and whooping-cough—were the subject of discussion by the Society of Medical Officers of Health on May 25th, Dr. Charles Porter presiding. Dr. H. Stanley Banks pointed out that, whatever its real utility as a measure of control, the public demand for the hospitalisation of scarlet fever continues almost unabated and, in his opinion, is justified by the prevention of sequelæ which is made possible by adequate treatment. As the result of his experience in a series of some 2500 cases injected with scarlet fever antitoxin by the intravenous route, Dr. Banks is convinced of the outstanding superiority of this route over the intramuscular. The complication rate amongst patients so treated is, he says, reduced almost to vanishing point. This view accords with that of most experienced workers that the early injection of scarlet fever antitoxin has a favourable effect not only on the initial toxæmia but on the complication rate, and permits of an earlier release of the patient from hospital, though this is not admitted by all. There has been within recent years a general shortening of the period of detention from the classical six weeks to four; Dr. Banks finds that after intravenous injection of serum patients may safely be released in about a fortnight, especially if they attend an out-patient clinic or are subject to some scheme of supervision for a week or two longer. In his experience the return case rate is not increased as the result of very early discharge; it has been well under 3 per cent. in his series.

On the question of control of diphtheria Dr. E. H. R. Harries voiced the general opinion that the only adequate method of control is the active immunisation of susceptible children. In view of the continued high incidence and unnecessarily high fatality-rate of the disease he expressed the hope that the introduction of large-scale immunisation might not be unduly delayed in this country. At the present time diphtheria is prevalent, and tends to be of a severe type. Dr. Harries deplored the continued misuse of the swab as a chief means of diagnosis of a clinically recognisable condition. Diagnostic swabbing may lead on the one hand to fatal delay in the injection of antitoxin, and on the other to the erroneous diagnosis of diphtheria in patients who are harbouring harmless diphtheroids. Patients diagnosed clinically should be sent into hospital at the earliest possible moment, he said, or at least they should be given antitoxin pending diagnosis. Several medical officers of health spoke of the difficulty of persuading practitioners not to wait for the result of a swabbing before injecting antitoxin. Dr. Harries thought that the reluctance to inject serum was largely due to exaggerated fears of anaphylaxis based upon the use of the older unconcentrated sera which were relatively rich in foreign proteins. Intravenous injection of massive therapeutic doses of concentrated serum even in potential sensitives very rarely gives trouble, and even when signs of anaphylaxis are observed injection of adrenaline, which should always be at hand, speedily clears them up. The injection prior to tonsillectomy of a combined prophylactic dose of diphtheria and scarlet fever antitoxins, with a view to the prevention of post-tonsillectomy diphtheria or scarlet fever, is now the practice at some of the London tonsil and adenoid clinics. Dr. Harries holds that the best procedure is to do preliminary Schick and Dick tests and inject only the specific antitoxin indicated by the results. For the carrier state he advocated rational surgical measures according to the type of nasopharyngeal abnormality discovered. True intermittency of the carrier state amongst convalescents was said to be rare, spurious intermittency, caused by contact reinfections in the ward, being frequent. It is desirable to nurse convalescent carriers in cubicles or in the open air. Indiscriminate swabbing for the detection of carriers in the community is now recognised as futile. For the control of outbreaks in institutions swabbing is a necessary procedure, but it must be combined with virulence tests and Schick tests in the way devised by Eagleton, Okell, and O'Brien.[1]

The control of measles by the use of convalescent or adult immune serum was discussed by Dr. William Gunn, followed by Dr. J. E. McCartney, who demonstrated the apparatus used for the collection of blood in the L.C.C. service. Both speakers stressed the value of convalescent serum either for temporary prevention or attenuation of the attack, and of adult immune serum for attenuation rather than prevention. It was pointed out that now, when an extensive epidemic of measles in London is terminating, is the time to collect large supplies of serum for use in the next epidemic. Dr. Gunn, while agreeing that parental whole blood was a reliable means of prophylaxis in the absence of serum, mentioned two objections which might be raised to its use: (1) the large amount—30 c.cm. as a minimum—which was necessary, and (2) the fact that the injection produces an artificial hæmatoma which takes some time to disappear. Discussing the hospitalisation of measles, Dr. Gunn insisted that in order to avoid post-admission complications ample bed spacing is necessary, and that free use should be made of barrier nursing. Better still, he thought, children should be nursed in cubicles or small ward units containing not more than four cots, or on balconies or verandahs. He advocated ample provision for stay in convalescent hospitals when the acute stage was over. With regard to whooping-cough, no reliable advance in therapy seems yet to have been made, but in the experience of some workers abroad fresh vaccines suitably prepared and injected in sufficient dosage had given promising results in prophylaxis.

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[1] THE LANCET, 1924, i., 800.

THE SURGEON AND THE GUNMAN

In discussing last week certain aspects of professional secrecy it was observed that the doctor's problems in this respect are by no means merely academic. Perhaps the most romantic of the situations about which the medical student is instructed is that of the hunted criminal who comes to physician or surgeon for treatment of his injuries. A classic example is now reported from America by the *Times* correspondent in New York. John Dillinger, the notorious gunman whom the forces of the law are seeking to apprehend, was apparently treated some weeks ago by Dr. Clayton May, a Minneapolis physician, for a gunshot wound. Did Dr. May inform the police? He did not. Consequently he was charged, together with Dillinger's sweetheart, before a Federal Court jury in St. Paul with the offence of conspiracy to harbour a criminal. Each of the accused was sentenced to undergo two years imprisonment and to pay a fine of 1000 dollars. A nurse who acted under Dr. May's directions was tried on the same charge and acquitted.

A country must protect itself against its public enemies; a doctor does not cease to be a citizen. For Dr. Clayton May, however, there was only one question. Did John Dillinger come to him for treatment trusting in his professional honour? The answer is obvious, and Dr. May's colleagues in every country will applaud his action in not betraying a professional trust.

INTENSIVE INSULIN AND GLUCOSE TREATMENT OF DIABETES

The conception of diabetes mellitus as a condition of pancreatic exhaustion is one which it becomes progressively harder to reconcile with all the facts. Prof. Arthur Ellis has lately described [1] a phenomenon which is difficult if not impossible to explain satisfactorily by this theory, and which may prove of no little importance in the understanding of the disease. In certain cases of diabetes under treatment wide variations occurred in the blood-sugar values, rendering them difficult to control, and it was thought that this might be due to depletion of the stores of hepatic glycogen. An attempt was accordingly made to remedy this by the hourly administration of glucose and insulin and somewhat surprising results were obtained. It was found first of all that very large amounts of carbohydrate could be dealt with in this way; and secondly, that there was a considerable temporary increase in carbohydrate tolerance. This was most striking in young subjects whose disease was of relatively short duration; in one case (that of a boy of ten) over 600 g. of glucose were given in the 24 hours, with 10 units of insulin hourly, and it was found not only that the boy became hypoglycæmic on this régime, but that a subsequent sugar-tolerance curve showed a fasting value of 0·054 and a rise to only 0·200 after 50 g. glucose. In another instance it was possible to reduce the insulin required to keep the patient sugar-free on a standard diet from 192 units daily before treatment to 9 units daily afterwards. Ellis reports eight cases treated in this way for a variable number of days, and in all but one a definite increase in carbohydrate tolerance took place during or after treatment. The improvement seemed to be progressive almost from the onset of treatment and to reach a maximum in about twelve days. Except in two cases (both of them early) the improvement was only temporary, but in none was there any evidence that the diabetic condition had been made ultimately worse. No further improvement occurred with a second course of intensive treatment which was given to two of the eight patients.

In considering his findings in relation to present theories of the pathology of diabetes, Prof. Ellis points out the difficulty of explaining the increased tolerance as due to an increased output of insulin by the patient on a high carbohydrate diet, since it is generally supposed that carbohydrate stimulates the output of insulin by raising the blood-sugar, whereas these patients tended rather to be hypoglycæmic during the period of treatment. Again, it is recognised that when small doses of insulin are given frequently, the glucose-equivalent of a unit is higher than when larger doses are given once or twice a day.[2] That this was not a complete explanation, however, was shown by control injections without glucose, after which the improvement was not comparable to that seen when glucose-insulin therapy was combined. Prof. Ellis's findings might be explained on the theory recently put forward by H. P. Himsworth [3] that insulin as secreted by the pancreas is an inactive material requiring activation by some unknown substance ("insulin kinase") produced by the liver. At present, however, there is no direct evidence that an increased activation of insulin occurred in these cases as a result of the intensive glucose-insulin therapy. Whatever the explanation of the increased carbohydrate tolerance may prove to be, it certainly seems to offer experimental support to the use of high carbohydrate diets in the treatment of diabetes.

ILLICIT TRAFFIC IN NARCOTIC DRUGS

Bulgaria has been suspected [4] of being the source of much of the illicit traffic in narcotics which has found its way into other countries of Europe and into Egypt. Quite recently some ten secret factories of morphine and heroin have been unmasked, mainly through the vigilance of T. W. Russell Pasha, director of the Central Narcotics Bureau and commandant of police at Cairo. Not only has the production of the opium poppy been greatly augmented during the past year, but it is alleged that not less than 3000 kg. of heroin have been manufactured in Bulgaria during the current year. Russell Pasha, in his annual report for 1933, states that the convicted addicts undergoing imprisonment in the State prisons of Egypt had fallen from 5681 in 1929 to 674 on Oct. 1st, 1933. He gives a list of 26 gangs of illicit traffickers in narcotics operating in Egypt which have "been tracked down and disposed of," and claims that the narcotic menace which threatened Egypt five years ago has been removed. Nevertheless, large quantities of illicit opium continue to be exported from Turkey, and the practice of eating opium is said to be spreading in the districts adjacent to Port Said and the Suez Canal. While the export of Syrian hashish has been checked, large quantities of Turkish hashish, which is richer in resin and aroma, are smuggled into Egypt. Although the Opium Advisory Committee and the Permanent Central Opium Board of the League of Nations have done much to expose and restrict the contraband traffic in narcotics, Bulgaria, and in the Far East, Manchuria, continue to be the producers of narcotics vastly in excess of the legitimate medical requirements of the whole world.

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[1] Quart. Jour. Med., April, 1934, p. 137.

[2] See THE LANCET, 1931, ii., 752.

[3] Ibid., 1932, ii., 935, and Jour. of Physiol., 1934, lxxxi., 29.

[4] See THE LANCET, 1933, i., 811, and ii., 818.

A MENTAL DEFICIENCY COLLECTION

THE library of the Royal College of Surgeons of England has recently acquired a collection of reports with full details and photographs of all the mentally deficient children—about 4000—admitted to the Fountain Hospital, Tooting-grove, under the Metropolitan Asylums Board from 1914 to 1927. These reports are classified and indexed, and are supplemented by a large series of published papers on mental deficiency from all parts of the world, regularly increased and kept up to date. The whole material is available for readers in the college library from 10 A.M. to 6 P.M. daily (Saturdays 10 A.M. to 1 P.M.), and the compiler and donor is willing to meet students by appointment. The librarian, it is stated, will be glad to have reprints of articles on mental deficiency or allied subjects for inclusion in the collection.

SUCCESS OF SPINAL ANALGESIA

Two papers lately published in widely distant cities bear testimony to the assured position which spinal anæsthesia has at last attained. One of them which has a special interest in connexion with the Royal Society of Medicine's debate on anæsthesia for urological surgery, reported in our issue of May 5th (p. 961), deals with spinal analgesia in the Bellevue urological service, New York, during the years 1925 to 1930 inclusive.[1] Local anæsthesia is the method of choice in this institution and operations which cannot be performed with infiltration are carried out whenever possible with spinal injection. The number of spinal injections reported on is 1490, of which 75 were for cystoscopies and the remainder for urological operations—on the prostate, kidney, and so on. The only fatalities were in persons almost moribund from sepsis and uræmia, and of these only two died in the operating theatre. Novocain was the agent used for all operations lasting not more than one hour; for the longer proceedings Nupercaine in 1 in 200 solution was employed. The patients receive morphia gr. ¼ before going to the operating theatre, and if the systolic pressure is found to be less than 100 mm. Hg, 50 mg. ephedrine hydrochloride intramuscularly; the spinal puncture is not made till the pressure has reached at least 100. The details given show excellent results from the technique adopted.

The other paper[2] comes from Sydney, New South Wales. The author has given over 2500 spinal injections for analgesia without a single death attributable to the anæsthetic. He is a strict follower of the technique originally introduced by Barker, but has reduced the diameter of Barker's instruments. He too employs ephedrine as a routine measure for preserving blood pressure and he uses Percaine in 1 in 200 solution in 6 per cent. solution of glucose. Not more than 2 c.cm. of this solution is needed, even when high analgesia is desired. He deprecates any form of preliminary medication and believes in securing the patient's mental quiet and intelligent coöperation by judicious conversation with him beforehand. Strict attention is given to the patient's posture just after injection, and this is shown in illustrations.

THE HOSPITALS YEAR-BOOK, 1934

THE Central Bureau of Hospital Information had no easy task before it when it took over the publication of "Burdett." We have now before us the fourth issue of its successor, "The Hospitals Year-Book," the object of which, in Sir Arthur Stanley's words, is to help all engaged in the administration of medical charities to compare notes and by the interchange of experience to promote economy and secure uniformity. The information required for this purpose can be obtained only by the willing coöperation of the hospitals themselves, and whereas for the most part this has been freely given in the spirit in which it was asked for, in other cases urgent entreaties failed to elicit the information. The difficulties have resulted in the delay of the Year-Book to a date nearly eighteen months after the end of the financial year to which it refers. It is a pity that this is so, for the Central Bureau is in a position to inquire into many of the problems that must interest all hospital administrators. What is the optimum size of a hospital? What is the ratio of nurses to patients? What is the productivity of this or that form of raising money? What expenditure will this or that system of heating and lighting involve? These and other questions are put by the Bureau for the clear and definite purpose of providing material with which to help administrators to carry out their work more effectively. We are happy to add our word to the appeal of the editor, Mr. R. H. P. Orde, B.A.—who is also hon. secretary of the British Hospitals Association—to the voluntary hospitals both in Great Britain and Ireland to coöperate as promptly and as fully as they can with the work of the Central Bureau. Nothing has done more to retain the support and confidence of the public in the voluntary system than the work of the associations represented at 12, Grosvenor-crescent, S.W. 1.

ON Tuesday next, at 5 P.M., Prof. O. L. V. S. de Wesselow will give the first of his Croonian lectures before the Royal College of Physicians of London. The subject will be arterial hypertension, and the following two lectures will be delivered at the same hour on June 7th and 12th.

THE eighth annual Macalister lecture will be delivered at the National Temperance Hospital on June 21st at 9 P.M. by Dr. Robert Hutchison. The subject is Praise and Dispraise of Doctors. The lecture is free to medical practitioners and to their friends of either sex.

THE series of articles on Prognosis contributed by invitation will be resumed on June 16th, when Dr. Reginald Miller will write on the Prognosis in Juvenile Rheumatism.

Sir Gowland Hopkins, P.R.S., will take the chair at a meeting arranged by the Committee against Malnutrition for Wednesday, June 13th. As announced in our last issue, this meeting is called to discuss the steps to be taken in combating "the widespread undernourishment of men, women, and children," and the speakers will include Dr. R. D. Lawrence, Dr. R. A. Lyster, Dr. Stella Churchill, and Prof. J. B. S. Haldane. It will be held at 8 P.M. at 34, Red Lion-square, W.C., and tickets may be had from the hon. secretary of the committee, Mr. F. Le Gros Clark, at 19c, Eagle-street, W.C.1.

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[1] Howley, T. F., and Robertson, J. P.: Amer. Jour. Surg., April, 1934, p. 129.

[2] Silverton, R. J.: Austral. and N.Z. Jour. Surg., Jan. 1934, p. 223.

THE PREVENTIVE ASPECTS OF MEDICINE

A Series of Lectures in progress at King's College Hospital Medical School

XXIV.—PRINCIPLES OF IMMUNISATION AND PREVENTIVE DISEASE

THE general principles of prophylactic immunisation may seem to come a little intrusively into a course of lectures that has dealt, in the main, with practice rather than with theory; but there have been many references to the application of the mechanisms concerned in specific immunity, and something is certainly to be gained by getting a clear picture of the way in which these mechanisms act. With such a picture in our minds we are, at least, more likely to use our instruments intelligently, and therefore successfully, and less likely to expect them to work under entirely inappropriate conditions.

If the picture is to be useful as a working diagram it must be clear; and if it is to be clear it must be sketchy. It must, indeed, depart in places from any strict canon of scientific accuracy; for this would demand that outlines should often be blurred, and shaded with provisos and exceptions, whereas we want them hard and clear. We must, then, for our present purpose, adopt the method of didactic simplification, adopting some theories as facts and ignoring awkward exceptions to rules. This will not matter so long as we are frank about it, taking our picture as a provisional working plan, subject to alteration if and when modifications become necessary. For the same reason it will be convenient to assume an almost blank ignorance of the mechanisms with which we are concerned, since once we begin to leave things out because they seem too simple and elementary it is difficult to know where to stop. Again, it will simplify matters if we omit all reference to authorities, and leave our summary of facts and theories undocumented.

Mechanisms of Antibacterial and Antitoxic Immunity

The mechanisms with which we have to deal are, in their essence, very simple. When certain foreign substances—substances to which we give the generic name of *antigens*, and which include bacteria, viruses, and toxins—gain access to the tissues, they stimulate the production of a particular kind of serum protein that is known as an *antibody*. The essential quality of an antibody is the presence of a specific chemical group, or arrangement of groups, that enables it to combine with the antigen, and, in so doing, to alter its physical and chemical properties.

The body makes use of this mechanism, which was probably developed in the first place for quite different ends, in protecting itself from infective disease. The antibodies that are formed when bacteria, or viruses, or their products, gain access to the tissues react specifically with them, rendering them relatively or wholly innocuous.

In the case of a toxin the result of the antigen-antibody union is neutralisation—neutralisation in the immunological sense, for there is little evidence that the toxic chemical grouping is itself destroyed or chemically changed. This neutralisation is accompanied by the flocculation of the toxin-antitoxin compound. It may be, though it is at present no more than a guess, that the innocuousness of this compound depends on its low diffusibility.

In the case of bacteria, or virus particles, the antigen-antibody union occurs on the surface of the parasite and results in the deposition thereon of scattered or continuous patches of antibody globulin. This change in the nature of the bacterial surface has important secondary results. The bacteria tend to adhere together, they are more easily ingested by phagocytic cells, and, in some cases, they become sensitive to a serum constituent known as complement, which produces a type of disintegration known as lysis. As a consequence, bacteria or viruses that would, in their unaltered state, become widely dispersed throughout the tissues and multiply freely in them are, when sensitised by a specific antibody, retained and held in check either in the immediate neighbourhood of their portal of entry, or in specialised tissue areas such as the lymph glands, the spleen, the liver, the bone-marrow, and so on, that contain depôts of active phagocytes of the reticulo-endothelial type.

But though we should always keep antitoxic and antibacterial immunity distinct in our minds, and can sometimes separate them in practice, we are often concerned with infective diseases that have both toxæmic and invasive characters. In such cases we may be able to alter the disease syndrome, by eliminating the toxæmic element, even though we fail to prevent those pathogenic activities of the parasite that depend on tissue invasion.

The differentiation between toxæmic and invasive effects suggested by such statements as these is, however, over precise, useful though it is for purposes of description and argument. Bacterial invasion would do no harm if the bacteria were not in some way toxic in themselves, and we must suppose that they injure the host's tissues by a variety of mechanisms which must, in the final analysis, be of a chemical nature. The real differentiation is between the immunity that can be developed to particular toxins that are freely liberated from the bacterial cells and diffuse widely throughout the tissues and the immunity that depends on limiting the dispersion and activities of the bacterial cells themselves, with all the other toxic mechanisms that they have at their disposal.

We may note that antibacterial immunity, in part because it depends on the interaction of many factors of which immunisation affects only one, in part because the living bacterium has methods of counter-attack that a non-living toxin has not, tends to be less consistently effective than the antitoxic form. Antiviral immunity, which is determined by the same general factors as the antibacterial type, though perhaps with minor modifications, is often conspicuously effective.

Methods of Exploiting Specific Immunisation

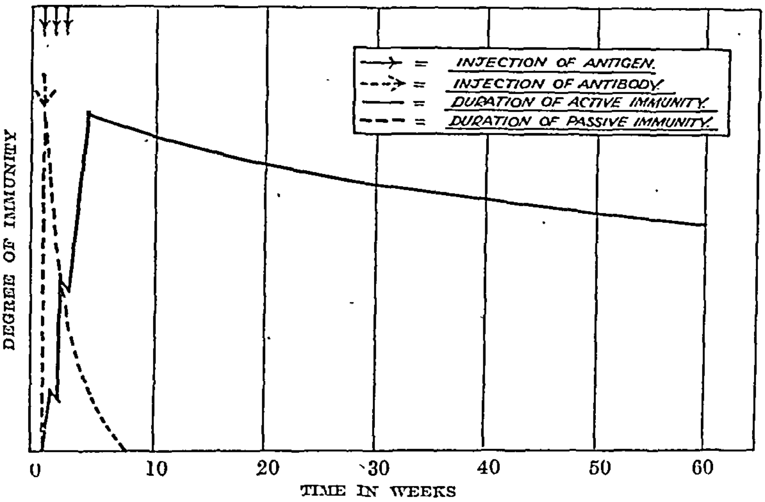
Before passing to the essential problem of specificity, which determines among other things the differentiation between antitoxic and antibacterial immunity that has been referred to above, we may consider in very general terms the ways in which we may exploit the mechanisms that we have outlined, limiting ourselves to prevention, and leaving the treatment of established infections out of account.

The thing we have to do is to provide a person with an adequate supply of the required antibody, or antibodies, and we can do it in two ways. We can make him make his own, by injecting the appropriate antigen. That is active immunisation. Or we can use some conveniently large animal, such as the horse, as an antibody factory, injecting into it the antigen with which we are concerned, and we can then provide the person to be immunised with the necessary antibodies ready-made by injecting into him the serum proteins of the previously immunised horse. That is passive immunisation.

Our choice of method is determined by the time relations of these two procedures. Active immunisation takes time. One dose of antigen may have little effect. If it does it will be several days at least, and sometimes weeks, before any effective immunity is induced. More often at least two injections are needed, at about a week's interval; and there is again a further interval before effective resistance is established. This, for instance, would seem to be the case in prophylactic vaccination against typhoid fever. Sometimes three, or four, or more inoculations are required before the desired result is attained, as, for instance, in the immunisation of certain persons against scarlatinal toxin.

To set against this relatively slow induction of active immunity there is the fact that such immunity, once induced, is relatively lasting. Our information as to how long it lasts is, in fact, much less precise than many written and spoken statements would lead one to suppose. *But it* certainly lasts for months in most cases, often for some years, and it may be for a decade or more. Its relatively long duration depends in part on the fact that the antibody in this case consists of a modified type of the person's own serum protein, and as such is probably not eliminated from the blood and body fluids at a rate greater than the normal turnover of serum proteins, whatever that rate may be. In greater part it rests on the fact that the formation of antibody outlasts the stimulus provided by the injection of the antigen, as may be shown by bleeding an immunised animal extensively and finding that the serum proteins, formed to make good the loss, contain a proportion of antibody little if any lower than before the bleeding. In greatest part, perhaps, it depends on the fact that in the actively immunised person a habit of rapid response to a particular antigenic stimulus has been established, so that any subsequent entry of that antigen into the tissues, as in an incipient infection, is followed by a prompt and vigorous production of antibody.

FIG. 1



The time relations of passive immunity are very different. The full protective effect of the injected antibody is established at once, but this effect is relatively transient. The antibody is usually a foreign protein. As such it is eliminated from the blood and tissue fluids more rapidly—in some sensitive persons much more rapidly—than the autogenous antibody proteins formed in active immunisation. Moreover the total amount of antibody available is limited to the amount injected. No more is formed, nor does the passively immunised person respond with any increased briskness to any subsequent entry of antigen into the tissues. The duration of effective passive immunity is, indeed, an affair of weeks, and usually of a few weeks. Fig. 1 shows approximately the time relations of the two types of reaction, the height of each curve corresponding to the degree of immunity existing at any given time period, and the times of injection of antigen or antibody being indicated by arrows.

The practical implications are obvious. We shall use the method of active immunisation whenever the persons to be immunised are likely to be exposed to risk over a long period, and when the immediate risk is not so great that the delay of a few days or weeks in the induction of immunity is a serious factor.

Thus we use this method in vaccination against small-pox, in infancy or at later ages, in antityphoid vaccination designed to protect troops or others proceeding to areas where this disease is frequent, in mass immunisation against diphtheria and so on. We use it, too, in some cases in which the risk is an immediate one, or in which it has already been incurred, since experience has shown that, under certain conditions, the advantage of durability outweighs the slight delay in induction. Thus, when an outbreak of diphtheria starts in a boarding school, or in a similar institution, the susceptible, Schick-positive children must be regarded as having been exposed to risk at the time the first case is diagnosed. We could protect them passively with antitoxin, but this would leave them susceptible to subsequent infection. It is generally regarded as better practice to induce an active immunity in all susceptibles, controlling this procedure by the examination of throat swabs, and promptly administering antitoxin to any susceptible child found to be carrying virulent *diphtheria bacilli* and showing any clinical signs of infection. Similarly, experience has shown quite clearly that a small-pox epidemic may be successfully *circumscribed by the* immediate vaccination or revaccination of all contacts, followed by a general vaccination campaign in the locality. It would seem that in this type of prophylactic vaccination, in which a living virus is employed, the induction of immunity is sufficiently rapid to prevent or modify the clinical infection, even when exposure has already occurred.

The use of passive prophylactic immunisation will be limited to those instances in which we are concerned with a specific risk of infection, occurring at a known time and unlikely to continue, or to be repeated, once this particular period has passed.

A good example is the use of passive prophylactic immunisation in tetanus. A man suffering from a severe and badly soiled wound, incurred in warfare or in any of the major accidents of civil life, runs a risk of contracting this disease. The administration of tetanus antitoxin, repeated at weekly or ten-day intervals for a few weeks, obviates or greatly reduces this risk, and since the risk is certainly not continuous, and, if unfortunately repeated, can, with certain limitations, be dealt with in the same way, the fact that immunity is of short duration does not matter. Sometimes we use this method in prophylaxis against diphtheria, as when a case of this disease accidentally gains admission to the children's ward of a general hospital, and it is more important to prevent the immediate spread of infection to other sick and susceptible children than to secure for them a more lasting immunity. In the case of scarlet fever this method of controlling a ward epidemic by passive immunisation is still more clearly indicated, because active immunisation is here a longer and less certain process.

Perhaps one of the best examples of the successful exploitation of passive prophylactic immunisation is the success that has been achieved by the use of convalescent or adult human serum in measles. By this means, provided that an adequate dose is given during the first five or six days after exposure to infection, it is possible in the great majority of cases to prevent the development of the disease. But, though the attack is prevented, the child becomes fully susceptible again after a few weeks; and, since future exposure to risk is almost a certainty, the procedure is often modified, except in the case of very young or sickly children, by giving a smaller dose of serum at a rather later date. The usual result of this procedure is that a clinically trivial attack of the disease develops and that the child is endowed with a lasting immunity to reinfection. The method affords a good example of mixed active and passive immunisation.

Specificity of Active and Passive Immunity

And now, after this brief sketch of the mechanisms concerned and the ways in which we exploit them, we may turn to a factor that is central to our whole problem, and which, for that reason, demands rather more detailed consideration. If this part of our discussion seems, in some aspects, a trifle academic, it is at least severely practical in its implications.

The harmful agents with which we are here concerned are bacteria, or viruses, or their products. The important thing about them from our present point of view is their size—not their smallness, but their bigness. We are dealing with cells, or particles, or molecules, that vary in diameter over some such range as 2μ to 0·004μ, if we regard them as spheres, or over a comparable range if we allow for departures from the spherical form. If, to avoid unnecessary decimals, we express size in terms of Angstrom units, these figures become 20,000 Å to 40 Å. However small these may be in relation to the visual power of the human eye, they are big things as looked at by an atom, or by any small group of atoms. The carbon atom, for instance, has a diameter of about 1·5 Å. There is room for many different chemical groupings on the surface of the smallest particle with which we have to deal, room for still more on the smallest virus, and for a vast number on an average-sized bacterium.

We must think of the surfaces of these particles, viruses, or bacteria, not as smooth and homogeneous, but as irregular, patchy, and studded with projecting chemical groupings, and it is the nature and arrangement of these groupings that determine all the reactions with which we are here concerned. Perhaps a fair simile would be an island with irregularly dispersed patches of a varied and rather formal vegetation. But it would be a spheroidal or cylindrical island, with the patches of vegetation all over it; and we should think of it as totally submerged, because, in all the reactions with which we are concerned, our particles or bacteria are suspended in a watery fluid. The sea-bottom on a pebbly or rocky shore, where there are numerous attachments for marine growths, is, perhaps, not a bad image of part of a bacterial surface.

The two objects in Fig. 2 afford very crude and imperfect models of the kind of surface that we must keep in our mind. Let us, for convenience of reference, call the left one A and the right one B. They are definitely misleading in regard to the relative size of the cells and of the active chemical groupings that they bear. If we wished to preserve anything approaching due proportion, we should have to regard them as molecules of some bacterial product, rather than as intact bacteria or viruses. To represent to scale an entire bacterial surface with active chemical groupings of a similar size would entail making a model several feet in diameter, but our smaller models will serve our purpose, so long as we remember that they are grossly out of scale. Those who are familiar with the modern concepts of structural organic chemistry will be able to construct far more adequate images for themselves. Those who are not, but would like to be, will find in a recent monograph by Dr. J. R. Marrack an admirable summary of the essential data.

There are various chemical groupings represented on the surface of these bacteria; but some of them have been given special prominence. We will suppose that these prominent groupings have a dominant rôle in determining the physical and chemical characters of the surface, and that it is the union of antibody protein with these groupings that sensitises the bacteria and renders them susceptible to the defence mechanisms that we have described above. In order that this union may occur the antibody protein must carry groupings having a chemical affinity to those present on the bacterial surface, and it is probable that the spatial arrangements of the active groupings on the large antibody molecule, as well as their individual nature, plays a significant part; since if the pattern of these groupings on the antibody is the same as the pattern on the antigen the surfaces will fit neatly together, with the corresponding groups in apposition, while if the pattern is widely different the fit will be a bad one. In any event, the relation between antigen and antibody is strictly specific, as specificity is understood by the organic chemist; and an antibody that will effectively sensitise organism A will have no effect on organism B. In Fig. 3, A and B are supposed to have been immersed in an antiserum prepared by immunising an animal against A. Antibody protein has been deposited on the specific antigenic groupings that dominate A's surface; but the surface of B remains unaltered. If A gained entry to the tissues of a person endowed with this antibody in adequate amount it would be arrested at or near its site of entry. If B gained entry to the same person's tissues it would multiply and give rise to a widespread infection.

Practical Limitations Imposed by Specificity

We cannot immunise a person against organism A by injecting organism B, nor against B by injecting A. We must keep this essential point clear in our minds. We must not, as immunologists, think in terms of diseases, of enteric fever, or pneumonia, or colds in the head, nor even, as we shall see, in terms of bacterial species, of pneumococci, or hæmolytic streptococci, or staphylococci, we must think in terms of antigenic groups and patterns. But the clinician or the medical officer of health does not want to immunise against an antigenic group or pattern. He wants, quite rightly, to prevent enteric fever, or pneumonia, or colds in the head; so that, for practical purposes, we must take the problem as he looks at it, and see how it looks to us in the light of our own immunological data.

The answers we get are simple and definite enough, though some of them may be disappointing. When we are reasonably sure that a particular disease is caused by one, and only one, bacterial species, and that bacterial species contains one, and only one, antigenic type, then immunisation against that antigenic type should be equivalent to immunisation against the disease. But where a given disease is caused by bacteria of different antigenic types—whether these types differ in other ways so that they are regarded as different bacterial species, as in the bacilli of the typhoid-paratyphoid group, or whether they are classified as different types within the same species, as in the different types of pneumococci—then immunisation against any one type is not equivalent to immunisation against the disease, and its relative effectiveness or ineffectiveness will depend on the relative importance of that particular antigenic type in the causation of the disease. If, for instance, the disease were caused by not more than two or three antigenic types we might, by the injection of one of them, produce an appreciable reduction in the incidence of the disease as a whole. What, of course, we actually do, is to try to include in our vaccine all those types to which a person is likely to be exposed. If these number only two or three the problem is easy, but where the number of types is very large we can hardly hope to obtain the same result, partly because there is a limit to the number of different types that can be effectively combined in a vaccine, partly because the relative importance of different types may vary from place to place and from time to time.

Specificity in Relation to Antitoxic and Antibacterial Immunity

It will be noted that, in our discussion of immunological specificity, we have so far confined our attention to antibacterial immunity. What happens when we bring antitoxic immunity into the picture ?

Fig. 4 shows our same two antigenic types of bacteria, but we will now suppose that they are of the kind that produce a soluble toxin that passes freely from the bacterial cells to the body fluids, and we will represent this toxin by smaller particles bearing antigenic groups that are the same for each particle of toxin, but different from the antigenic groups on A or B. We have chosen to suppose that the two antigenically different bacteria produce the same kind of toxin, and this is a useful supposition because it corresponds to what actually occurs with such an important toxin-producer as the diphtheria bacillus, of which there are many different antigenic types, all producing the same toxin. The same is true of the tetanus bacillus, and, as we shall see, of hæmolytic streptococci. It may, indeed, so far as our present knowledge goes, be regarded as the usual state of affairs.

Suppose that these organisms and the toxins they produce are brought into contact with a serum containing antitoxin but no antibodies acting on the bacteria themselves. Antibody protein will unite with the particles or molecules of toxin, as in Fig. 5, but the bacteria will not be affected. If the bacteria are of the kind that have little invasive power, as is the case with the diphtheria bacillus, then a person possessing this antitoxic antibody will be effectively immune to the clinical disease because, although the diphtheria bacilli that gain access to his throat will not be interfered with, any toxin that they produce will at once be neutralised.

Let us now suppose that our organisms are not diphtheria bacilli, but some organism that has invasive as well as toxigenic powers—say, for instance, two antigenic types of hæmolytic streptococci. We shall, by inducing an effective antitoxic immunity, change the disease without necessarily preventing it, since we shall eliminate only one part of the total clinical syndrome. If we take as an instance scarlet fever, we shall approximate to prevention in the clinical sense, because the erythrogenic toxin is responsible for so much of the classical syndrome of the disease, including the characteristic rash, that what remains would hardly be included in the same clinical category. We shall, however, be left with cases of tonsillitis, sometimes complicated with otitis, that would have been regarded as scarlet fever if the rash and certain other lesions had not been suppressed.

If, however, the type of infection is one in which the invasive activity of the organism is far more important than its toxigenic action, then we should expect little success from antitoxic immunisation.

It is customary, in antitoxic immunisation against such diseases as diphtheria and scarlet fever, to use as our immunising agent a culture filtrate that contains the toxin but not the bacterial bodies. In the case of diphtheria we treat this toxic filtrate to make the toxin harmless, though still antigenic. In the case of the erythrogenic toxin of the hæmolytic streptococcus we usually employ the unaltered toxin, because, in suitable graded doses, it produces no serious toxic effects. In neither case do we make any attempt to induce an antibacterial immunity. We could do so, by injecting bacterial cells as well as their soluble toxin, but it would be of little avail, because we should be frustrated in our attempt to add an antibacterial to our antitoxic immunity by the multiplicity of antigenic types.

FIG. 2

FIG. 3

Suppose that, in order to protect against the invasive as well as the toxigenic effects of the hæmolytic streptococcus, we injected bacterial cells as well as toxin, using a streptococcus of the A type, Fig. 6 indicates the kind of result that we should obtain. If the person immunised were exposed to infection with a streptococcus of Type A all would be well. The toxin would be neutralised and the streptococci sensitised. But if the streptococcus were of Type B, or of any other type except A, there would be no protection against its invasive action ; and, since the different antigenic types of pathogenic hæmolytic streptococci are in fact very numerous, there seems no immediate hope of inducing an effective antibacterial immunity against the various infections to which they give rise.

The Concord between Expectation and Experience

So far we have been considering our practical problems in the light of our immunological data, and we have been concerned with one particular type of mechanism, and with that only. We have no right to assume a priori that it is the only mechanism at work, and we must be prepared to reconsider our working hypothesis, if the results obtained in properly controlled trials carried out in the world outside our laboratories are not in accord with our expectations. We may, therefore, usefully conclude our discussion by a brief reference to a few of the instances in which the available records allow us to test our conclusions in this way. Some of the relevant evidence has been referred to already, for illustrative purposes, but repetition is often difficult to avoid, and is occasionally excusable.

Vaccination against *small-pox* is one of the oldest and perhaps the most successful form of prophylactic immunisation. The antigenic material employed is living vaccina virus. Recent studies have demonstrated quite clearly that vaccinia virus and variola virus are antigenically identical. Vaccination provides a striking example of effective immunisation against a disease that is caused by a single antigenic type of micro-organism.

Enteric fever is a clinical designation for a group of infections caused by the typhoid and paratyphoid bacilli. Since the typhoid bacillus plays a major part in most countries, we should expect the use of an antityphoid vaccine to lead to a significant reduction in the number of enteric infections, and this has proved to be the case. But we should not expect it to prevent infection with the paratyphoid bacilli A, B, and C, and experience in the war showed that it does not. These three types, together with the typhoid bacillus itself, account for the vast majority of enteric infections. In Western Europe the C type is infrequent. By including the A and B types in our vaccine, in addition to the typhoid bacillus, we should expect to obtain a very considerable reduction in the frequency of enteric infection. Experience in the war indicated that this reduction is, in fact, obtained. Enteric fever affords a good example of a disease in which effective immunisation is possible because the causal agents, although they are antigenically different, are few in number.

FIG. 4

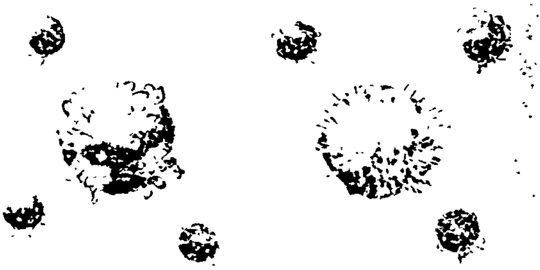


FIG. 5

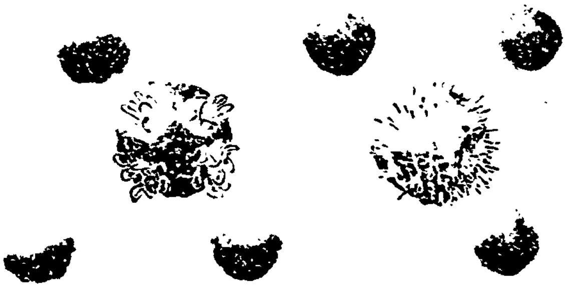
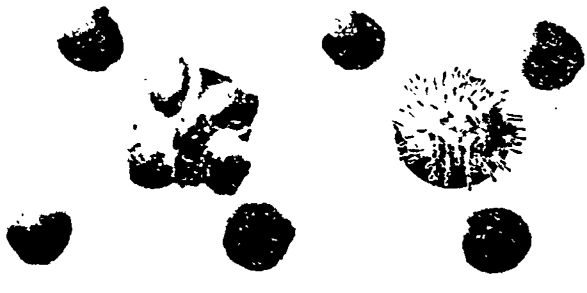


FIG. 6



Lobar pneumonia is caused by a wide variety of different antigenic types of pneumococci. The best that we could expect from prophylactic vaccination would be a reduction in frequency commensurate with the elimination of infection due to the types included in our vaccine, and since the types are many and vary in their relative frequency from place to place and from time to time, our expectations would not run high. In fact, the history of prophylactic immunisation against lobar pneumonia has been a chequered and, on the whole, unhappy one. We might take it as an illustration of failure in the face of a multiplicity of antigenic types; but fairness compels the proviso that the records suggest that some part of the failure at least may be due to a relative ineffectiveness of antibacterial immunisation against this disease, even when the immunological requirements are fulfilled.

We have noted already that *diphtheria* affords an excellent example of the effectiveness of antitoxic immunity, unassociated with antibacterial immunity, as a protection against an infection that is almost wholly toxæmic, and that *scarlet fever and allied conditions* illustrate the modifying effects of an antitoxic immunity on infections that are in part toxæmic, in part invasive. We may, perhaps, expand our picture of immunity to hæmolytic streptococci by noting that the clinical records indicate quite clearly that an antitoxic immunity affords no significant protection against such a typically invasive disease as *puerperal septicæmia.*

In general it is true to say that where the basic principles of specific immunisation have been followed a very considerable degree of success has been achieved, and that the failures or partial failures have been encountered where we should have expected to find them. But these basic principles have not always been followed. They are not always followed to-day. The results that are obtained when they are neglected are a most useful control to the results that are obtained when they are observed.

One of the most important of our minor infective diseases is the *common cold.*

Its causation must still be regarded as an unsolved problem, though there is a growing body of evidence in favour of the view that the primary causative agent in the acute infectious type of cold that spreads readily from one person to another is a filtrable virus. This evidence, and many other observations relating to the normal bacterial flora of the nose, throat and nasopharynx, tell strongly against the view that the acute infectious cold is caused by pneumococci, influenza bacilli, hæmolytic streptococci, Gram-negative diplococci, or any of the other potential pathogens that are commonly found in these situations. This does not mean that these bacteria play no part in the total syndrome of the common cold as it frequently develops. They are quite certainly concerned in the suppurative infections of the nasal passages and sinuses that are such common complications. But the pneumococcus, the influenza bacillus, and the hæmolytic streptococcus are all antigenically heterogeneous species. There are at least 32 types of pneumococci, probably as many, if not more, types of hæmolytic streptococci, and an unknown but certainly large number of types of influenza bacilli. There is no evidence that the strains of any one of these three organisms associated, probably as secondary invaders, with the common cold are confined to a few serological types; all the available evidence is to the contrary.

What is the probable result of inoculating a person with a mixed bacterial vaccine containing a few types of pneumococci, some hæmolytic streptococci and influenza bacilli, and perhaps an assortment of other organisms? If, as seems probable, the common cold is a virus disease, then we shall clearly *not protect against the primary infection*. Shall we lessen the frequency of concomitant bacterial infections? It does not seem likely. We know very little in regard to the power of bacterial vaccines to afford protection against antigenically similar organisms when these organisms are acting as local secondary invaders in association with a filtrable virus, and what little we do know is not very hopeful. Even if it were, our expectations would be small; for there is no reason to suppose that the particular pneumococci, influenza bacilli, or hæmolytic streptococci that are present on, or gain access to, the nasopharyngeal mucosa of the vaccinated sufferer from the common cold will be antigenically similar to those included in the vaccine.

In conformity with our expectations, we find that in almost any instance in which a practical trial has been made of this method on an adequate scale and with proper controls it has been a clear and conspicuous failure.

Influenza falls into the same category. It is probably *another virus disease*. When we have obtained the virus in a manageable form—or the viruses if more than one antigenic type is concerned—we shall probably be able to protect successfully against influenza; and when we can do that we shall have conquered one of the major pestilences of our time. But, though the primary cause of influenza be a virus, there can be no doubt at all that the influenza bacillus plays a very important part as a concomitant bacterial invader; sometimes, at least, pneumococci and hæmolytic streptococci may play a similar or accessory rôle. What is the likelihood that a vaccine composed of influenza bacilli, or of influenza bacilli and pneumococci and hæmolytic streptococci, will prevent influenza, or significantly lower the frequency of the associated bacterial infections? The answer is clearly the same as that at which we arrived in regard to the common cold; *and here again large-scale trials, carried out under properly controlled conditions*, have amply confirmed that answer.

The results of experience—the negative as well as the positive ones—thus give us some confidence that, in applying the principles of specific immunity, so far as we know them, to the problems of practical prophylaxis, we are on the right lines. If so the future is not unhopeful. We are still very ignorant. In only a few instances do we yet know which bacterial antigen, of the many that are always present, plays a dominant rôle in the immunising process. Even in these cases we do not know whether other antigens, which alone may be quite ineffective, play a significant accessory part. It is probable that the crude bacterial suspensions we now employ are very imperfect reagents. The problem of improving them is a problem in applied chemistry. When it is solved we may be in a much better position than we are to-day to control those infective diseases that have failed to yield to other methods of preventive medicine.

W. W. C. TOPLEY, M.D., M.Sc., F.R.C.P., F.R.S.,
Professor of Bacteri[illegible]
versity of London;
and Immunol[illegible]
Hygiene and Tropical Medicine.

PANEL AND CONTRACT PRACTICE

INCAPACITY FOR WORK

AT its meeting on May 24th, the Medico-Legal Society discussed the nature of incapacity for work within the meaning of the National Health Insurance Acts. Mr. W. J. FOSTER, assistant secretary to the Prudential Assurance Co., said that under the 1924 Act an insured person was entitled to sickness or disablement benefit if he was rendered incapable of work by some specific disease or by bodily or mental disablement. The Act was not helpful in defining incapacity. The question was begged by talk about incapacity being due to such disease or disablement, but a certain amount of case law had arisen in the form of decisions given by referees appointed by the Ministry of Health. A member of an approved society was bound by the rules of his society; if the interpretation of these rules was disputed he had the right of appeal to the Ministry. The Minister then appointed either a barrister or a solicitor, associated with a medical assessor when expert medical knowledge was required. In the case of a woman appellant the medical assessor must be a woman doctor unless the appellant's own doctor was of her sex.

In the phrase "rendered incapable of work," what, Mr. Foster asked, actually is the meaning of the word "rendered"? Take a man who had had an accident for which he was receiving compensation; subsequently another incapacity supervened in the form of illness. His compensation pay is greater than his sick pay but when payment for compensation ceases can he then be said to be "rendered" incapable by the supervening illness? A decision has been given that a man cannot be "rendered" incapable if at the time of the commencement of the supervening illness he was already incapacitated. Total incapacity was required by the Act. In compensation cases a man may be totally or partially disabled but in health insurance a partial incapacity did not entitle to benefit.

In the old days to excuse a man from attending (say) a jury it had to be proved that he was "in bed with his boots off" and four knights were sent to his house to satisfy the court that this was so; they would report that he was "unbuckled, unbooted and ungirt." This process of proving incapacity was not possible to-day. They had to use common sense in deciding capacity to work. The work was supposed to be remunerative and *suitable to the capacity of the worker. It need not necessarily* be the worker's normal occupation. A miner with rheumatism and lumbago might be quite incapable of ever hewing coal again but able to do some light work. Disablement benefit which follows 26 weeks of sickness benefit must not be regarded as an old age pension. It was necessary to take into account the man's previous training, his aptitude for work, the availability of work—although slackness of work in the labour market could not be taken into account in deciding whether incapacity existed. It was the duty of an insured person to try to make himself capable by training and a decision had been given on this matter in the case of a blind man who was offered training for quite a long period (three or four years) but who by refusing to be trained lost his appeal against the society which had stopped his disablement pay.

After 26 weeks of sickness benefit the question of *alternative employment will come up for consideration*. This may be considered before or it may be taken later, but it is not the duty of the medical man attending the case. Here the society has to use common sense in dealing with individual cases. An illiterate labourer cannot be expected to take up clerical work.

COMPENSATION OR HEALTH INSURANCE

Compensation cases, said Mr. Foster, at times give rise to difficulty under the Act. A judge had defined total incapacity as *the condition of a man in which* a physical defect made his labour unsaleable, and a partial incapacity made his labour sell for less than normal. There was *no parallel under* the N.H.I.

Acts. A charwoman dislocated her shoulder at work. The dislocation was never reduced and although she had no loss of power in the forearm she could not scrub owing to the shoulder trouble. She was found to be partially disabled *qua* compensation but she had to find alternative occupation. In pregnancy the particular circumstances of each case had to be considered. A normal pregnancy might give rise to incapacity but in arriving at a decision no consideration could be given to rules of employers nor to æsthetic appearance. The welfare of the unborn child was irrelevant. The woman's occupation was important. There was the case of a married private secretary who claimed benefit for a normal pregnancy; but she lost. Hardship undoubtedly occurs when women are dismissed from their employment. Often on marriage women give up their normal occupation and take on the ordinary duties of a housewife. Can this be called remunerative occupation? The husband would have to pay someone to do the work if the wife did not do it. This was sometimes disputed but in reply to a recent question in the House of Commons the Minister of Health had agreed that housework could be considered as remunerative work. Difficulty arose where incapacity for a short period was frequent as in asthma, menorrhagia or epilepsy. Such patients cannot keep their work. In cases of epilepsy one has to consider the nature of the fits, their effect on the person and his mentality, but the difficulty of obtaining employment through the possibility of incapacity was not to be considered when deciding capacity to work.

Mr. Foster finally dealt with the subtle distinction made by the House of Lords between incapacity *to* work and incapacity *for* work. A workman with a useless eye whose condition was not noticed sustained an accident to his bad eye so that the condition became apparent through the removal of that eye. It was held that his capacity *to* work was the same as it was before when he had worked with the other eye only, but that his capacity *for* work was now nil because no one would employ him with one eye. He was awarded total compensation. Actually the wording of the N.H.I. Act was incapable "of," a phrasing not quite so wide in its meaning.

THE MEDICAL CRITERION

Dr. R. GODWIN CHASE, a member of the London Insurance Committee, said he thought the chief criterion a medical man had to use in deciding incapacity for work was whether the patient would be harmed by doing that work. Patients might describe terrible pains which they felt about joints in which full movement could be obtained. Practitioners sometimes failed to take into consideration the question of travelling involved in return to work. Pregnancy cases were really difficult; amongst 20,000 certifying doctors each would have his or her own view as to whether a woman should work in the latter stages of pregnancy. Experts were not agreed. Even the Ministry of Health spoke with two voices. While memoranda issued from the health insurance department implied that uncomplicated pregnancy was no bar to work, other memoranda from the infant welfare department advised quite long periods of rest before confinement took place. Patients talked to each other about these certificates and the conscientious doctor might lose patients through acting in the strictly legal manner. Certification in infective diseases was also difficult. A waitress with a septic rash on her face would not be allowed by her employers to work, although she was capable within the meaning of the Act. The same applied to scabies. Patients thought they were harshly treated if a certificate of incapacity was refused; they could, however, be given a letter to say that, whilst they were not incapable within the meaning of the Act, yet it was highly undesirable for them to work owing to the infective condition present.

Dr. W. DUNCAN, senior medical officer, General Practitioner Service, Ministry of Health, said that only a few doctors had any legal training, and it was a marvel to him that so few mistakes were made by the 20,000 doctors in insurance practice. Some of them took the view that their duty was solely to treat the patient and to get him better; they should not be bothered with certificates, that was the approved societies' work. But they would not let laymen decide whether incapacity was present and would not like a strange doctor to visit their cases solely to give certificates. A possible difficulty arose from the attendance required at hospital or clinic at some particular time which might reveal to an employer the fact that an insured person was ill, and in (say) a case of venereal disease might lead to dismissal from work. He thought some societies had funds from which as an additional benefit they could pay for the cases of infective diseases mentioned. Some married women in class K, reading that they were able to have six weeks benefit before they went out of insurance, interpreted that to mean that they were to have it and would approach the doctor with the statement, "I want my six weeks benefit."

A SUGGESTED SOLUTION

Dr. R. E. CROSSE thought it would be better if the medical side could be separated from the administrative side of the work. Doctors would then look after the medical problems, leaving administrators to deal with such difficulties as whether the insured person was entitled to benefit, and the relation of work to environment and availability. The word incapable should not be used in certification and the doctor should simply be asked to say whether a person was fit to work. He would divide patients into three classes: (1) those temporarily unfit for their work, (2) those permanently unfit for their work but not unfit for some other work, (3) those unfit for anything. He had tried to get this adopted some years previously but it was then thought that insured persons in small approved societies would suffer if it were adopted.

Mr. H. LESSER said the Act was administered by approved societies who inherited the old friendly society spirit and worked quite smoothly. Only fine points involving important principles were decided by referees. For example, a society was able to show that a blind man in receipt of disablement benefit received betting slips for a bookmaker in a public house, being taken there by a small boy. They could not prove he was paid for this but they said it was normally a remunerative occupation and on appeal the society won, thus establishing the principle of no benefit if working. It was always difficult to say at what point in pregnancy work should cease. The scope of a society's ability to pay was determined by a financial contract. It had been stated that one day's extra pay to everybody would mean complete financial breakdown of the Act. An insured person might be unfit but not incapable. To decide whether convalescent treatment should be given it was not a question whether it was beneficial but whether a stay at a convalescent home was necessary to recovery. Doctors and societies must interpret their legal obligation on common sense grounds except where there was serious suspicion of malingering. A huge proportion of insured persons were declared fit on

Saturday to resume work on Monday; was this the advice which the doctor gave to the patient or was it the patient who was then advising the doctor?

Dr. A. Baldie thought that, whilst the average doctor was not a lawyer, in his own sphere he was very efficient. He was not allowed to alter the form of certificate and at times he must include people who were not really incapable. If the Act had been unable to stand the strain of the last nine years its actuarial basis must be wrong; but the doctors were blamed for it. Alteration in regulation and in the forms of certificates would enable insurance doctors to do their work properly and render the Act more popular.

Mr. Foster, in reply, pointed out that work was often quite beneficial to neurasthenic people. Doctors were "debarred" from giving certificates of incapacity in uncomplicated cases of pregnancy; he thought that was going rather far. The infective cases were very difficult. Additional benefit could be paid to an insured person because his relatives were ill with infection but not because the patient himself was infective, if not incapable. He did not think the alteration of certificate would help much, for the doctor would have to decide the category in which to put the patient and again references to the R.M.O. would still be necessary.

Novarsenobillon

The Birmingham insurance committee reports that the Minister has decided not to refer to referees the question whether the intravenous injection of novarsenobillon falls within the terms of those extra services outside the Act for which an insurance practitioner (with special qualifications to perform such services) may make a charge to the patient. This decision is in conformity with that of the local medical committee and of the insurance committee, both of which had agreed that this service was outside the Act. It is possible that the toxicity of the medicament rather than the degree of manipulative dexterity required has determined the decision, for the injection of varicose veins has been definitely held to be within the scope of the Act.

THE SERVICES

IMPROVED CONDITIONS FOR THE ROYAL AIR FORCE MEDICAL SERVICE

New regulations have now been issued embodying the recommendations of the Warren Fisher report. To lessen the strain of orderly duty and so increase the number of candidates for temporary commissions in the R.A.F.M.S. that orderly duty is to be reduced. Within five years about half of the short-service officers will be enabled to get permanent commissions. Those leaving for the reserve in three years will get a gratuity of £400 (£50 increase), increased after five years' service to £1000 (£300 increase). Permanent officers not qualified for retired pay and allowed to retire between five and ten years will get £1000 gratuity, after ten years £1500, and after 15 years £2800 (£300 increase). Promotion will be accelerated and increased throughout: pay of squadron leaders will be increased by 5*s.* daily, but without the present increase after eight years (when presumably they will have won their promotion); wing commanders and below can serve up to the age of 55, an extension of four years. Specialist pay is not now given as such to specialists, but in future they may win accelerated promotion (up to two years) to squadron leader. These changes offer definite prospect of better incomes to R.A.F. officers in future.

COMMISSIONS IN THE ROYAL ARMY MEDICAL CORPS

The War Office announces that applications are invited from medical men for appointment to commissions in the Royal Army Medical Corps under the new conditions announced recently. Candidates will be selected for commissions without competitive examination and will be required to present themselves in London for interview and physical examination on or about June 6th. They must be registered under the Medical Acts and normally must not be over the age of 28 years. Successful candidates will in the first instance be given short service commissions for five years, at the end of which period they may either retire with a gratuity of £1000 or apply for a permanent commission. Permanent commissions will be given to officers selected from among those who wish to make the army their permanent career.

Full particulars on application, either by letter or in person, to the assistant director-general, Army Medical Services, The War Office, London, S.W. 1.

ROYAL NAVAL MEDICAL SERVICE

Surg. Lt.-Comdrs. A. E. Phillips and G. Kirker to be Surg. Comdrs.

Surg. Lts. W. W. Beach, A. R. Ewart, and R. Russell to be Surg. Lt.-Comdrs.

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Lt.-Comdr. (D) D. C. Lamond is placed on the retd. list.

Surg. Sub-Lt. K. W. Martin to be Surg. Lt.

The following appointments are notified: Surg. Lt.-Comdrs. C. C. Ungley to *Tiverton*, R. L. Stubbs to *Valiant*, and F. A. McLaughlin to *Malaya*.

Surg. Lt. G. M. Tanner to *Tiverton*.

ROYAL ARMY MEDICAL CORPS

Lts. J. E. Snow, N. H. Lindsay, C. S. Gross, W. R. M. Drew, and A. Macdonald to be Capts.

ARMY RESERVE OF OFFICERS

Lt.-Col. P. J. Marett having attained the age limit of liability to recall ceases to belong to the Res. of Off.

TERRITORIAL ARMY

Col. C. R. White, retd. T.A., vacates the appt. of Hon. Col. R.A.M.C. Units, 53rd (Welsh) Div., on completion of tenure.

Col. C. L. Isaac, retd. T.A., to be Hon. Col. R.A.M.C. Units, 53rd (Welsh) Div.

Maj. C. Helm (Lt.-Col. Res. of Off.), resigns his commn. in the T.A.

Lts. W. E. Underwood and W. E. Orchard to be Capts.

E. F. S. Morrison (late Cadet, Epsom Coll. Contgt., Jun. Div., O.T.C.), to be Lt.

J. A. Blain (late Cadet, St. Andrews Univ. Contgt., Sen. Div., O.T.C.), to be Lt.

TERRITORIAL ARMY RESERVE OF OFFICERS

Capt. W. H. A. Dodd resigns his commn.

Lt. H. R. Vernon, from Active List, to be Lt.

INDIAN MEDICAL SERVICE

Col. G. C. L. Kerans retires.

Majs. R. Hay, W. P. Hogg, and H. E. Murray to be Lt.-Cols.

Capt. J. S. B. Forde relinquishes his proby. appt.

ROYAL AIR FORCE

Flight Lt. J. Parry-Evans is promoted to the rank of Squadron Leader.

The undermentioned Flying Offrs. are promoted to the rank of Flight Lts.: J. McGovern, J. F. Dales, T. D. L. Bolan, and R. E. W. Fisher.

SPECIAL ARTICLES

GENERAL MEDICAL COUNCIL

PRESIDENT'S ADDRESS.

In opening the 139th session of the Council, on May 29th, the President, Sir Norman Walker, after mentioning that the composition of the Council was the same as at the previous session, made graceful allusion to three one-time members who had died in the interval. Of Sir William Whitla, a member of the Council from 1910 to 1916, he said that his work on the Pharmacopœia Committee was extremely valuable, while of A. G. Barrs, who was a member of the Council from 1904 to 1918, he said that on the same committee a deep knowledge of therapeutics had been wisely employed. Of the third deceased member, Sir Donald MacAlister, he recorded the remarkable fact that his tenure of office had lasted 43 years, during 27 of which he had been President. After alluding to the many instances in the proceedings of the Council where MacAlister had given evidence of familiarity with every facet of the work, and to the practical employment to which his linguistic scholarship had been put, he pointed to his remarkable capacity as "a Moderator, as he would have been called in the Scottish Ecclesiastical Courts;" for only short and pertinent talking was encouraged by him, while throughout his whole term of office only in six years was a deficit displayed in the balance sheet of the Council; one such deficit was £7 8s., while before Sir Donald's time annual deficits would average £1000. Sir Norman continued:—

"The accounts for the year 1933 have been duly audited and presented to Parliament. They show a surplus of income over expenditure for the year of £564 7*s.* 4*d.*, a surplus not so large as that of last year, but still satisfactory. I shall not trespass on the province of the treasurers by referring to any details.

In 1933 the names of 1343 practitioners were added to the Medical Register, being two less than in 1932. But the losses were 150 less, and so the Register on Jan. 1st, 1934, contained 56,741 names, the largest number ever reached. The Student's Register showed an increase of 340 names, 272 in England, 38 in Ireland, while Scotland stands just where it did last year. The Education and Examination Committees will doubltess take note of these figures.

MEDICAL EDUCATION

The General Council for Medical Education and Registration has as its main object the first of these subjects. The Education Committee was set up by the Council in 1859, and down the years successive education committees have submitted valuable reports, many of them still well worth study. Medical education and its bearing on the public weal is to-day the subject of anxious consideration in every civilised country. In the United States there have been far-reaching inquiries into medical practice and its many relations to the public, and a realisation that, as times change, it may be that education must change with them. Sir Henry Acland, through whose scholarly addresses I often go gleaning, said in 1887 "that the Council had received whatever aid can be derived from abundant criticism, which would have had more real value had it fully appreciated the difficulties of a period of progress never equalled." It is doubtful if there had been, in the years prior to 1887, so great and so rapid changes as there have been in the last 20 years. The boundaries of medicine are ever extending, and there is more and more to be learned. The Council welcome all the inquiries which are going on as likely to contribute to the solution of a difficult problem. But it is right here to make clear the position of the Council. It is not possible to frame a model curriculum which will suit every country or every school in any country, and no hard-and-fast arrangement of subjects is possible, even if it were desirable.

In this connexion, the Royal Commission of 1882, on whose report the 1886 Act is based, said: "It would be a mistake to introduce absolute uniformity into medical education. One great merit of the present system, so far as teaching is concerned, lies in the elasticity which is produced by the variety and number of educational bodies. Being anxious not to diminish in any way the interest which the teaching bodies now take in medical education, or to lessen their responsibility in that respect, we desire to leave them as much initiative as possible. In certain matters of general importance, such as the duration of study, and the age at which a student should be permitted to practise, common regulations ought, we think, to be laid down; but we wish to record our opinion that nothing should be done to weaken the individuality of the universities and corporations, or to check emulation between the leading institutions of the country." This policy has been followed by the General Medical Council, whose primary concern is with the qualifications for admission to the Medical Register. These are the words of the 1886 Act: "The standard of proficiency required from candidates at the said qualifying examination shall be such as sufficiently to guarantee the possession of the knowledge and skill requisite for the efficient practice of medicine, surgery, and midwifery, and it shall be the duty of the General Medical Council to secure the maintenance of such standard of proficiency as aforesaid." Each licensing body is free to try out new methods, and those which are found successful are likely to be imitated and perhaps improved on by others. I do not think it is sufficiently realised in other countries how much we gain from our unique system of external examiners; this meeting of teachers from different schools is perhaps the most efficient way of diffusing information. The Education Committee have been hard at work since last we met; their report, which was yet in its final form this forenoon, will be in your hands, I hope, to-morrow, and it is proposed to set aside Friday forenoon for its discussion.

THE PHARMACOPŒIA COMMISSION

The Pharmacopœia Committee will pass on to us the report of this Commission, which shows that that body have been diligently engaged in preparing the ground for the next Pharmacopœia, and the laboratory provided in this building has been very useful in connexion with their researches.

PROGRESS IN HONG KONG, SINGAPORE, AND CEYLON

The executive committee has considered reports by Sir Richard Needham on Hong Kong and Singapore. These show how useful it is to these far-away schools to have a visitor from this country with a full knowledge of the conditions of medical education in this country, and both Hong Kong and Singapore are grateful for the help they have received from our visitor. Sir Richard at Ceylon revisited the Medical College, and reports that many of the improvements whether the disease is increasing or diminishing in Great Britain; the widespread neglect of adequate precautions against its increase makes any diminution improbable. No cure for tuberculosis is known. Immunisation with B C G may soon approach a stage of practical usefulness, but to-day is not an important outwork in the farmers' defence. The eradication of bovine tuberculosis in cattle would lead to its disappearance in swine as well as in horses, goats, and cats. The scheme proposed for the eradication of bovine tuberculosis recommended by the Committee should in its opinion provide for:—

(1) The institution of a list of tuberculosis-free herds (accepted herds), tested with tuberculin from time to time under official supervision, and declared to be free from bovine tuberculosis.

(2) The provision of free advice and free tuberculin-testing for owners of herds who agree to make bona-fide efforts to free their herds from tuberculosis, or who have established free herds.

(3) Financial help, where necessary, by way of loans or the guarantee of loans, to approved owners for the purpose of undertaking expenditure required by the veterinary inspector as necessary to eradication.

(4) The securing to owners of disease-free herds of a higher price for their milk than that obtained by other owners.

(5) The taking of administrative measures designed to secure that tuberculosis-free cattle from accepted herds should be moved about the country and exposed for sale without running the risk of being brought in contact with other cattle.

(6) The adjustment of regulations governing the production of graded milks and the grades of milk officially approved, and the making of regulations relative to the compulsory pasteurisation of milk with a view to increasing the incentive to farmers to eradicate tuberculosis from their herds.

As far as human health is concerned bovine tuberculosis is regarded as the only material danger from milk. Contagious abortion may be responsible for serious loss to dairy farmers, both directly and indirectly by causing sterility, even if the suggested 40 per cent. prevalence is not grounded upon adequate statistical investigation. Undulant fever, its counterpart in man, is, however, rare in this country and would still be unimportant even were its incidence as high as in Germany. The real protection of the public from this fever, the report remarks, is their own immunity. About the importance of milk in the spreading of other infectious diseases the available evidence is regarded as inconclusive. Such milk-borne infections however have one peculiarity—the organisms responsible for them multiply rapidly in milk; the pooling of milk consequently adds enormously to the chances of infection.

The only remedy, even tolerably complete, for the condition into which our dairy industry has been allowed to fall is the complete eradication of bovine tuberculosis from the herds. The limiting conditions of such action at the outset are the lack of trained veterinary staff and the shortage of healthy cows available to replace those infected. The uncoördinated initiative of individual farmers under the stimulus of higher prices for pure milk at a rather distant future will not of itself create the necessary conditions for any general advance. For this reason it is essential that the Ministry of Agriculture should take an active hand in planning and subsequently in directing the campaign for eradication, especially in its early stages.

The Grading of Milk

The Committee considers that all milk sold for consumption in liquid form should be required to be sold under an official designation. The designation of the milk should be clearly marked on the vessel in which it is sold to the public, a distinctive colour being prescribed for marking each designated milk. No liquid milk should be sold that does not attain a fixed standard of cleanliness, or pre-pasteurisation standard, at the farm. This standard should approximate to that at present required for Grade A milk. In addition, all milk should conform to the definitions of one of the following designations:

(1) *Certified milk*—namely, milk which has not undergone any process of heat-treatment and is derived from tubercle-free herds. This milk should not be required to be bottled on the farm.

(2) *Pasteurised milk*—namely, milk which has undergone, once only, a process of heat-treatment approved for this purpose by the Ministry of Health or the Department of Health for Scotland, and has undergone no other process of heat-treatment. Pasteurisation should be permitted only in a plant licensed for the purpose.

(3) *Sterilised milk*—namely, milk which has been raised to the boiling-point or higher in a plant licensed for the purpose, and which has undergone no other process of heat-treatment.

(4) *Milk (uncertified)*—namely, milk which has undergone no form of heat-treatment and is not derived from tuberculosis-free herds, but which attains a certain hygienic standard.

No milk which has been held in any vessel containing more than 100 gallons of milk, unless derived from a single herd, should be sold for consumption in liquid form unless it has subsequently been pasteurised.

The council of any county borough, municipal borough, large burgh, or urban district in an area the population of which exceeds 100,000, and the London County Council should have the right to prohibit the sale of milk (uncertified) as defined above after a date which shall not be earlier than five years after the initiation of the scheme of eradication, provided that it has given not less than two years' notice of its intention to do so.

Pasteurisation

The pasteurisation of milk to be sold under the order should only be permitted in plants the design of which has been officially approved, which have themselves been tested on erection to ensure that they conform to the approved design, and which are frequently inspected during working by an officer of the sanitary authority, who should apply prescribed tests and record the results at each visit. The authority responsible for approving the design of plants should act only after consulting the National Physical Laboratory.

It is emphasised that pasteurisation cannot make dirty milk clean and, therefore, would not discourage farmers from producing clean milk. If correctly introduced, it would encourage them to undertake eradication. On the other hand, the compulsory pasteurisation of milk would disturb the balance at present existing in large towns between the producers of milk in comparatively distant areas for sale after heat-treatment, and the producers of milk in the immediate neighbourhood of large towns for sale in a raw state. Pasteurisation is incompatible with the business methods of producer-retailers and, if it were made compulsory at once, a large number of them would be deprived of their present livelihood.

No policy at the outset satisfies both the interests of public health and those of producer-retailers near large towns. Clinical inspection is not a satisfactory alternative to pasteurisation in those areas where the latter is practicable, nor could producer-retailers make their milk safe by the eradication of tuberculosis until this has made considerable progress in the breeding areas. But, as soon as a sufficient supply of clean cows can be created to enable producer-retailers to free their herds from tuberculosis, it will be fair to make them choose between doing so and submitting to pasteurisation.

IRELAND

(FROM OUR OWN CORRESPONDENT)

BOVINE TUBERCULOSIS AND MILK

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The number of stillbirths notified during the week was 289 (corresponding to a rate of 43 per 1000 total births), including 45 in London.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY.—The annual banquet of this society will be held at the Trocadero Restaurant, Shaftesbury-avenue, London, W., on Wednesday, July 4th, at 7.30 for 8 P.M. The hon. secretary may be addressed at 19, Queen Anne-street, W.1.

whether the disease is increasing or diminishing in Great Britain; the widespread neglect of adequate precautions against its increase makes any diminution improbable. No cure for tuberculosis is known. Immunisation with B C G may soon approach a stage of practical usefulness, but to-day is not an important outwork in the farmers' defence. The eradication of bovine tuberculosis in cattle would lead to its disappearance in swine as well as in horses, goats, and cats. The scheme proposed for the eradication of bovine tuberculosis recommended by the Committee should in its opinion provide for:—

(1) The institution of a list of tuberculosis-free herds (accepted herds), tested with tuberculin from time to time under official supervision, and declared to be free from bovine tuberculosis.

(2) The provision of free advice and free tuberculin-testing for owners of herds who agree to make bona-fide efforts to free their herds from tuberculosis, or who have established free herds.

(3) Financial help, where necessary, by way of loans or the guarantee of loans, to approved owners for the purpose of undertaking expenditure required by the veterinary inspector as necessary to eradication.

(4) The securing to owners of disease-free herds of a higher price for their milk than that obtained by other owners.

(5) The taking of administrative measures designed to secure that tuberculosis-free cattle from accepted herds should be moved about the country and exposed for sale without running the risk of being brought in contact with other cattle.

(6) The adjustment of regulations governing the production of graded milks and the grades of milk officially approved, and the making of regulations relative to the compulsory pasteurisation of milk with a view to increasing the incentive to farmers to eradicate tuberculosis from their herds.

As far as human health is concerned bovine tuberculosis is regarded as the only material danger from milk. Contagious abortion may be responsible for serious loss to dairy farmers, both directly and indirectly by causing sterility, even if the suggested 40 per cent. prevalence is not grounded upon adequate statistical investigation. Undulant fever, its counterpart in man, is, however, rare in this country and would still be unimportant even were its incidence as high as in Germany. The real protection of the public from this fever, the report remarks, is their own immunity. About the importance of milk in the spreading of other infectious diseases the available evidence is regarded as inconclusive. Such milk-borne infections however have one peculiarity—the organisms responsible for them multiply rapidly in milk; the pooling of milk consequently adds enormously to the chances of infection.

The only remedy, even tolerably complete, for the condition into which our dairy industry has been allowed to fall is the complete eradication of bovine tuberculosis from the herds. The limiting conditions of such action at the outset are the lack of trained veterinary staff and the shortage of healthy cows available to replace those infected. The uncoördinated initiative of individual farmers under the stimulus of higher prices for pure milk at a rather distant future will not of itself create the necessary conditions for any general advance. For this reason it is essential that the Ministry of Agriculture should take an active hand in planning and subsequently in directing the campaign for eradication, especially in its early stages.

The Grading of Milk

The Committee considers that all milk sold for consumption in liquid form should be required to be sold under an official designation. The designation of the milk should be clearly marked on the vessel in which it is sold to the public, a distinctive colour being prescribed for marking each designated milk. No liquid milk should be sold that does not attain a fixed standard of cleanliness, or pre-pasteurisation standard, at the farm. This standard should approximate to that at present required for Grade A milk. In addition, all milk should conform to the definitions of one of the following designations:

(1) *Certified milk*—namely, milk which has not undergone any process of heat-treatment and is derived from tubercle-free herds. This milk should not be required to be bottled on the farm.

(2) *Pasteurised milk*—namely, milk which has undergone, once only, a process of heat-treatment approved for this purpose by the Ministry of Health or the Department of Health for Scotland, and has undergone no other process of heat-treatment. Pasteurisation should be permitted only in a plant licensed for the purpose.

(3) *Sterilised milk*—namely, milk which has been raised to the boiling-point or higher in a plant licensed for the purpose, and which has undergone no other process of heat-treatment.

(4) *Milk (uncertified)*—namely, milk which has undergone no form of heat-treatment and is not derived from tuberculosis-free herds, but which attains a certain hygienic standard.

No milk which has been held in any vessel containing more than 100 gallons of milk, unless derived from a single herd, should be sold for consumption in liquid form unless it has subsequently been pasteurised.

The council of any county borough, municipal borough, large burgh, or urban district in an area the population of which exceeds 100,000, and the London County Council should have the right to prohibit the sale of milk (uncertified) as defined above after a date which shall not be earlier than five years after the initiation of the scheme of eradication, provided that it has given not less than two years' notice of its intention to do so.

Pasteurisation

The pasteurisation of milk to be sold under the order should only be permitted in plants the design of which has been officially approved, which have themselves been tested on erection to ensure that they conform to the approved design, and which are frequently inspected during working by an officer of the sanitary authority, who should apply prescribed tests and record the results at each visit. The authority responsible for approving the design of plants should act only after consulting the National Physical Laboratory.

It is emphasised that pasteurisation cannot make dirty milk clean and, therefore, would not discourage farmers from producing clean milk. If correctly introduced, it would encourage them to undertake eradication. On the other hand, the compulsory pasteurisation of milk would disturb the balance at present existing in large towns between the producers of milk in comparatively distant areas for sale after heat-treatment, and the producers of milk in the immediate neighbourhood of large towns for sale in a raw state. Pasteurisation is incompatible with the business methods of producer-retailers and, if it were made compulsory at once, a large number of them would be deprived of their present livelihood.

No policy at the outset satisfies both the interests of public health and those of producer-retailers near large towns. Clinical inspection is not a satisfactory alternative to pasteurisation in those areas where the latter is practicable, nor could producer-retailers make their milk safe by the eradication of tuberculosis until this has made considerable progress in the breeding areas. But, as soon as a sufficient supply of clean cows can be created to enable producer-retailers to free their herds from tuberculosis, it will be fair to make them choose between doing so and submitting to pasteurisation.

IRELAND

(FROM OUR OWN CORRESPONDENT)

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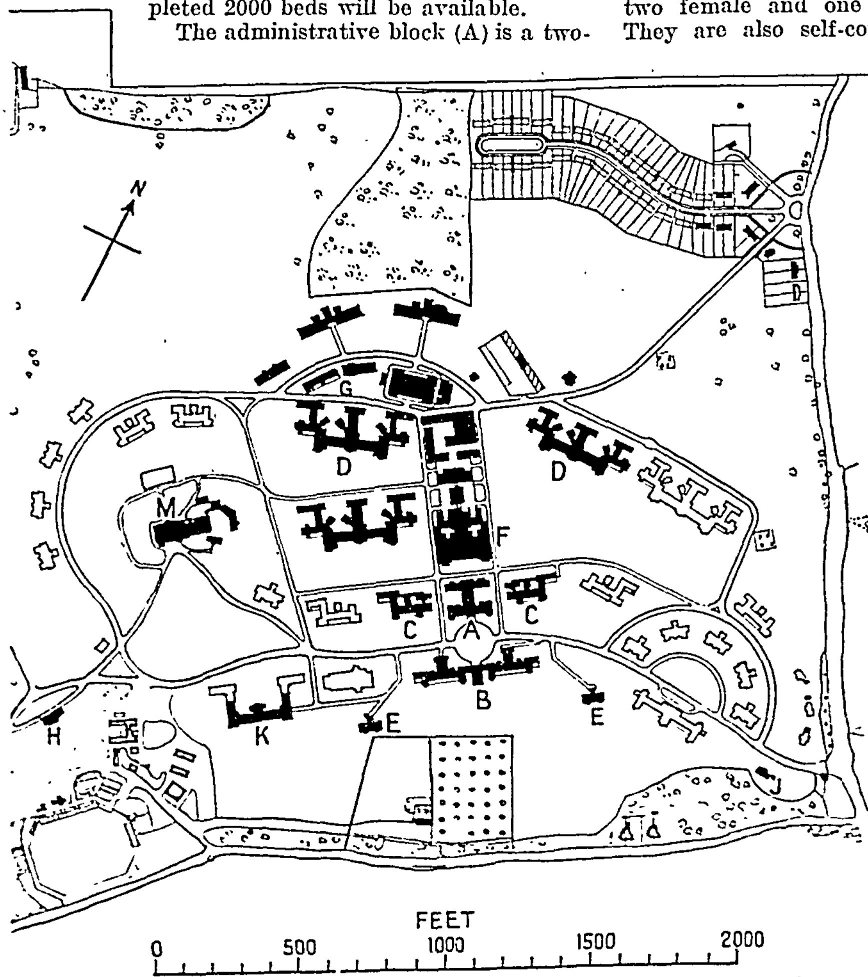
SHENLEY MENTAL HOSPITAL

THE new Middlesex mental hospital at Shenley, near St. Albans, was opened by H.M. The King on Thursday last. The need of more accommodation for mental cases in the northern part of Greater London was brought home to the county authority as long ago as 1911. In 1924 the Porters Park Estate, including a large mansion, the property of Mr. Raphael, came into the market and was bought by the Middlesex county council for £80,000. Besides the mansion and its accessories there are two farms, some cottage property, and a large area of woodland and arable land, totalling just over 1166 acres. The council selected 500 acres of this to found the new hospital, situated for the most part on a ridge 420 ft. above sea level, with an extensive view over Hertfordshire to north and south. Building was commenced in 1932 to the plans of the county architect, Mr. W. T. Curtis, F.R.I.B.A., the contractors being John Laing and Son, Ltd., of Mill Hill. In July, 1932, the foundation-stone was laid by Sir William Lobjoit, chairman of the mental hospitals committee. The hospital is planned on the villa system with small nursing units ranging from 20 to 45 patients. The first section of the building scheme now completed has beds for 1047 patients and about 500 staff. Some 500 patients were admitted during January. When the hospital is completed 2000 beds will be available.

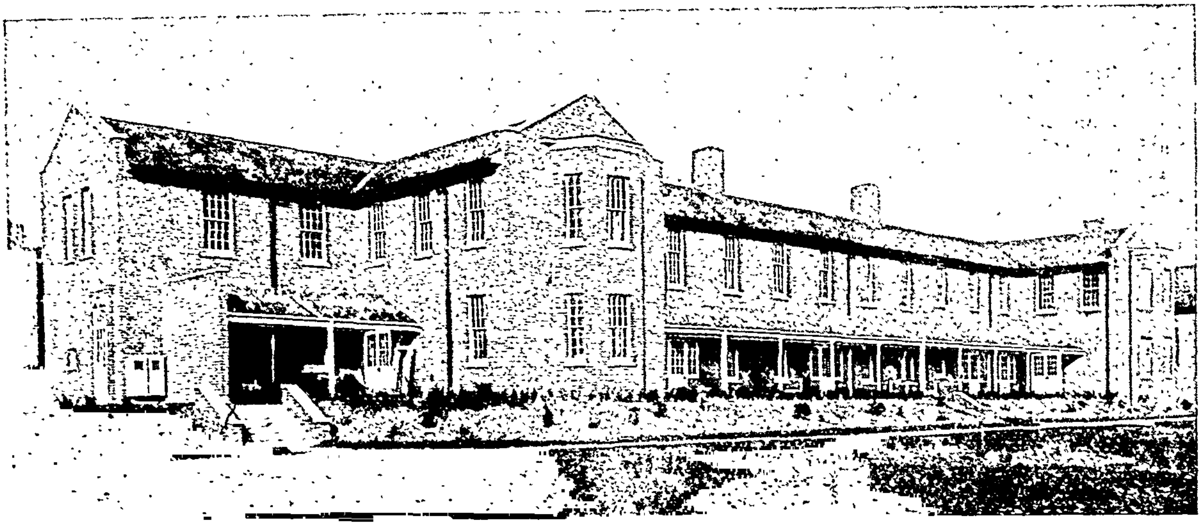
The administrative block (A) is a two-storey building, being approximately in the centre of the colony; on either side of it are the separate villas and hospitals for male and female patients; behind are the recreation hall, kitchen, laundry, and stores. In the central building are the usual offices and committee rooms below, and above the flats for the resident doctors. The laboratories, operating theatre, dispensary, and dental room on the north side are all admirably equipped. The dental chair and apparatus are of modern English make, with electric control; mirrors and instruments are attached to cords which spring back into sockets when released. As there is no supply of gas to the colony in general a small petrol engine has been installed to supply the bunsen burners and other open flames required in the laboratory work.

The reception hospital (B) to the south of this block will house 40 patients of either sex; the doctors' offices and examination rooms lie round the centre hall, the wards and several private rooms to east and west. As throughout the colony where patients are concerned this block faces south. Every patient is admitted to this building and moved as soon as possible after a mental and physical examination to a suitable department. The hospital blocks proper (C) are self-contained nursing units on the ground and first floors. There is a large south verandah where beds can be wheeled outside without any difficulty. Each has a small surgical ward of three beds. Behind these are the closed blocks (D), two female and one male, for more acute cases. They are also self-contained, with day and night wards, kitchen, baths, and lavatories. A home-like appearance has been studied and there are no long corridors, the wings of each block being separate wards opening out of the main building by glass doors. The decorations and furniture are simple and of modern design in pleasing colour; in the sitting rooms railway posters give an extra note of cheerfulness. In these blocks also there are some private and single rooms and several padded rooms for violent cases. Noteworthy are the two small convalescent villas (E) planned and furnished as nearly as possible to home conditions, looking out on lawns and orchards.

The grounds are still in process of development. Borders and shrubberies have been laid out and a large wooded area is to be cleared of brushwood for walking exercise within the boundary. The woodland has been left untouched where possible and there are many fine forest trees standing. The absence of fences, which is very gratifying to the practised eye, will, it is to be hoped, justify an optimistic experiment. Small hedges have



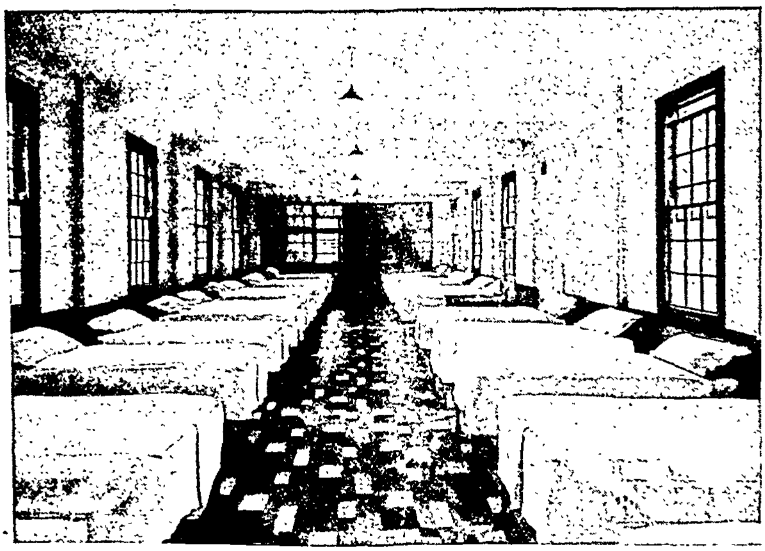
Lay-out plan of the hospital showing actual buildings in black, prospective buildings in outline



Admission hospital, south elevation

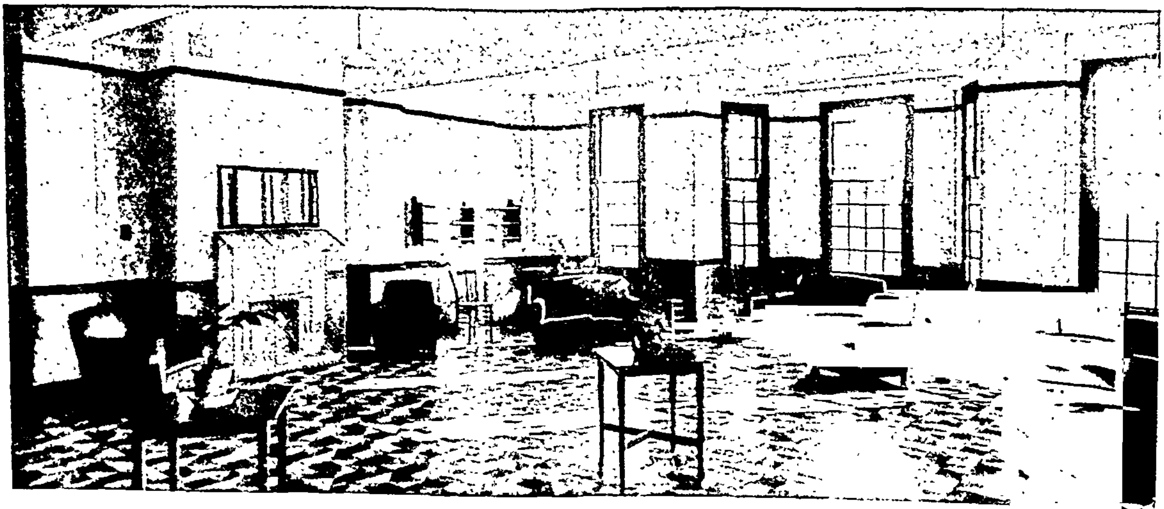
[Photos. by Hobbs, Ogden & Co.

been planted to divide the various blocks; otherwise they are only separated by paths. The fences round the closed blocks for acute cases are painted green, and it is hoped to have climbing plants on them. The usual institution brick walls are nowhere to be seen and there is nothing to suggest imprisonment to patients or their friends, or to offend the eye of neighbours.



One of the women's wards

The recreation room (F) in which the opening ceremony took place is a spacious hall, seating 1000 persons, with a floor of polished wood well sprung for dancing. The stage has modern lighting and curtains with dressing rooms for the performers; and underneath it chairs can be stored. The room is also equipped with a talking cinema and wireless, the latter being relayed to every ward in the colony. A



A day room for women

smaller room adjoining can be used for lectures or services. In it too refreshments can be secured during entertainments from a recess in direct contact with the kitchen. This is capable of cooking for 2500 persons by electricity or steam. The food is carried on insulated trolleys to the various blocks and the patients have all their meals in their own dining rooms. The menus are on a monthly system which allows for greater variety and avoids the foreknowledge of what dish is to be expected on a particular day of the week.

Variety has also been considered in the patients' dress; evidence for this is in the large store room behind the kitchen. There is no fixed uniform: the women have a choice of coats, skirts, and jumpers; the men a selection of tweed suits, shirts, and ties; so that a patient is not conspicuous outside the institution. Interest in clothes is regarded as conducive to self-respect. Occupational therapy is carried on in a separate building (G) with three large bright rooms, in addition to the large amount of similar work in the wards. The wool rugs, the cane wastepaper baskets, the trays and stools are testimony to what even chronic patients can be taught to do.

Of the other new buildings on the estate there are separate houses for the medical superintendent, Dr. G. W. Shore (H), and his deputy (J) as well as 24 cottages for the married male staff. The nurses' home (K) is a particularly bright and attractive house on the south side of the colony, self-contained with a separate kitchen of its own. Each nurse has her own room with hot and cold water laid on, the matron and assistant matron having their own small suites. A wide terrace overlooks a run of four tennis courts. The mansion (M) is not at present occupied, but it is hoped to use it later for private paying patients and early cases. A staff village occupies the north-east corner of the site.

This modern hospital for the rate-aided mental patient is a tremendous advance on the mental hospitals of even a few years ago, and will lead to emulation on the part of other county authorities that can contemplate the expense, which has so far been in the neighbourhood of £520,000. It would be desirable to give the general public very free access to this hospital and the opportunity to realise that the patients could not be better looked after in many private homes than they are here.

CORRESPONDENCE

TREATMENT OF MYASTHENIA GRAVIS WITH PHYSOSTIGMINE

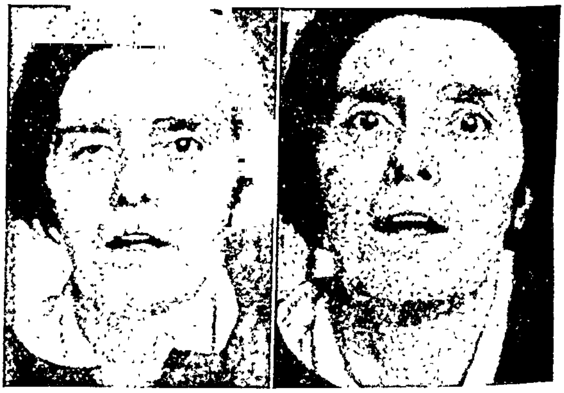
To the Editor of THE LANCET

SIR,—The abnormal fatiguability in myasthenia gravis has been thought to be due to curare-like poisoning of the motor nerve-endings or of the "myoneural junctions" in the affected muscles. It occurred to me recently that it would be worth while to try the effect of physostigmine, a partial antagonist to curare, on a case of myasthenia gravis at present in St. Alfege's Hospital, in the hope that it would counteract the effect of the unknown substance which might be exerting a curare-like effect on the myoneural junctions. I found that hypodermic injections of physostigmine salicylate did have a striking though temporary effect.

Mrs. M., aged 56, had had a previous attack of myasthenia gravis, lasting about six months, 14 years ago. Gastric ulcer four years ago. Non-specific infective arthritis seven months ago, now improved.

Towards the end of last February she found that she was unable to hold her shopping bag, and that her head used to fall forwards when she knelt to do the hearth. She had to remain in bed after March 18th, and had difficulty in sitting up. Her jaw then began to droop, she had to hold it up with her hand, and the left eyelid began to droop. Speech became indistinct when she was excited, swallowing was difficult, and fluid sometimes regurgitated through her nose. She was admitted to the hospital on March 28th, and a few days later weakness came on in the middle and ring fingers of both hands. The weakness is much increased by excitement, and is lessened by rest. It becomes worse as the day goes on. There is no wasting, and the tendon reflexes are all present. The masseters respond slightly or not at all to faradism; a myasthenic reaction has been obtained in the left deltoid. Radiograms show obsolete pulmonary tuberculosis. The thymus is not enlarged.

On April 11th treatment with hypodermic injections of physostigmine salicylate, gr. 1/60 once a day, was begun. In from half an hour to an hour after the injection the left eyelid "goes up" (see Figure), arm movements are much stronger, the jaw drops rather less, swallowing is improved, and the patient feels "less heavy." The effect wears off gradually in from 2–4 hours. With injections of gr. 1/50 the improvement is greater, and it lasts for 4–5 hours. Still greater improvement, lasting for 6–7 hours, followed an injection of gr. 1/45, but the patient felt rather faint and trembly, her "inside seemed all on the work," and she felt as if "something were going to happen." These feelings did not completely disappear till an hour after the injection. In all, 26 injections of physostigmine salicylate have been given. The effect is not quite uniform: on two occasions injections of gr. 1/45 and gr. 1/60 failed to produce any obvious effect. She feels better and more cheerful since the injections were begun.



Before injection the patient cannot raise her left eyelid. Thirty minutes after it the eye is fully open. (The photographs are reproduced from a cinematograph film and are reversed left for right.)

Given by the mouth, physostigmine salicylate gr. 1/60 produced no obvious effect, but an hour after gr. 1/30 slight improvement occurred. No improvement followed control injections of water, pilocarpine gr. 1/20, strychnine gr. 1/30, adrenaline ♏5, ephedrine gr. ½, or acetylcholine 0·05 and 0·1 g.

I think that this effect of physostigmine on myasthenia gravis is important, though it is only temporary, for it improves swallowing and might tide a patient over a respiratory crisis. It supports the opinion that the fatiguability is due to a poisoning of the motor end-organs, or "myoneural junctions," rather than to an affection of the muscle itself. It may be significant that physostigmine inhibits the action of the esterase which destroys acetylcholine. I have not had the opportunity of treating another case to confirm the findings. The administration of other drugs whose action resembles that of physostigmine is under consideration. It is also possible that physostigmine might be of some service in botulism and in cobra poisoning, in both of which a curare-like poisoning of the "myoneural junctions" of the respiratory muscles has been stated to be the main cause of death.

I wish to thank Dr. Philip Hamill for his interest and advice, and Dr. W. D. Wiggins, medical superintendent of the hospital, for permission to publish the case. I am, Sir, yours faithfully,

M. B. WALKER.

St. Alfege's Hospital, Greenwich, May 12th.

COLLAPSE THERAPY IN PNEUMONIA

To the Editor of THE LANCET

SIR,—The annotation on p. 1127 of your last issue leads me to seek the hospitality of your columns in order to state my views on the position of this method of treating pneumonia. Artificial pneumothorax is not to be regarded as a specific for lobar pneumonia; the induction may have no effect on the progress of the disease or may even make it worse. Used, however, strictly according to the technique described, I am convinced that a crisis can be produced in a few hours and the patient cured in the majority of cases. For this the correct technique is essential and disappointment has, I believe, been caused by failure to adjust the size or spacing of the fills. A four-hourly chart of the respiration-rate will help as a check on the progress of treatment.

The first fill must always be large, 350–550 c.cm., depending on the physique of the patient and the day of disease. The earlier the day, the larger the fill necessary, no attention being paid to the manometric readings. It will be found that in a few hours there will be a marked fall in the respiration curve, and if the fill is adequate the rate should drop to 22–25. The second fill, given 12–24 hours later, will require to be almost as large as the first, although as conditions should by now be more normal the pressure readings of the manometer can here be of some assistance. If the respiration-rate 12 hours after the first fill is under 25 the second fill can be postponed to 24 hours, but not longer. After the second fill the respiration-rate will steady at 20–22, and if this is maintained no further treatment is necessary. A temporary peaking of the curve to 25 can be disregarded, but if the curve again rises above 25 a third fill is advisable, while should it rise above 28 this fill is necessary. It need usually only be a small one, 200–250 c.cm., but it is wise to err on the side of overfilling as the air is absorbed very rapidly.

The technique thus elaborated is based on a definite conception of the pathology of lobar pneumonia and of the mechanism of the natural crisis.

I am, Sir, yours faithfully,

Hull, May 27th. J. J. COGHLAN.

BILATERAL EMPYEMA

To the Editor of THE LANCET

SIR,—The communication of Mr. D'Arcy McCrea in your issue of May 26th (p. 1117) attracted my attention, because I have had myself several cases of bilateral empyema: first as a chief physician of Imperial Sanatoriums in Russia and then during the war, especially in large hospitals in Finland. The first case I had was in 1909, at Irkutsk Hospital in East Siberia, which was demonstrated then by my senior colleague, Dr. N. Bessonoff. The method he applied, and which I followed with outstanding success afterwards and demonstrated to the students and my colleagues, is very simple. First of all it is necessary to replace the aspirated pus by saline solution with addition of a very dilute solution of iodine. This diminishes possibility of collection of pus in the cavity, leaving the pressure practically the same, also diluting and disinfecting the remaining contents. I used as a rule Potain's aspirator with two bottles connected with the same needle; one bottle with negative pressure, the other with positive. By changing taps I could either aspirate or introduce certain liquids. Bottles are graduated, so it was easy to reinstate the original pressure in the cavity. As a rule I introduced just a little less than I aspirated, in order to reduce the pressure somewhat. I never treated both sides simultaneously and always under control of X ray pictures before and after the manipulation. Unfortunately I had no chance to keep exact statistics, but the number of cases was not less than 80 and the mortality was very low.

I am, Sir, yours faithfully,

London, May 28th. B. PEROTT.

PETER DE ALCOBASSE

To the Editor of THE LANCET

SIR,—The quotation from Hutchins, "Hist. of Dorset," cited in the article on Alcobasse, Henry IV.'s physician, appearing in your issue of April 21st, obviously contains a blunder. One wonders what reason Hutchins can have had for making him into an Italian, with a hung, drawn, and quartered name. "Alcobasse" is clearly the Gallicised form of Alcobaça, about 80 miles north of Lisbon. The Cistercian Abbey was founded by Affonso Henriques, the first king of Portugal, and in Henry IV.'s time it was one of the largest and most powerful monasteries in Europe. Nothing would be more natural than that a physician should be selected from the successors to the Arabian culture in the Iberian Peninsula, and, as it is stated that Peter was born in Portugal, there seems no reason to doubt that he was educated, if not born, at Alcobaça. There might even be a connexion between his name and that of King Peter, whose tomb is in the Abbey, and who died in 1367—45 years before Henry IV.'s physician was admitted Dean of Westminster. Certainly this was a period of the closest associations between England and Portugal, cemented by the Treaty of Windsor in 1386, and by the marriage of John of Gaunt's daughter, Phillipa of Lancaster, in the following year to King John of Portugal, who was made a Knight of the Garter by Henry IV. in 1400.

I am, Sir, yours faithfully,

ALAN G. BODMAN.

Lisbon Medical Mission, May 25th.

ORGANISED TREATMENT OF MOTOR ACCIDENTS

To the Editor of THE LANCET

SIR,—In your report (p. 1137) of my paper on this subject at the Royal Institute of Public Health congress there is one slip that might lead to misapprehension. I am quoted as comparing the modern orthopædic hospitals to the military special hospitals "where the services of surgeons skilled in dealing with head and chest injuries would be available."

What I was actually trying to convey was that the network of orthopædic schemes with their central hospitals, which now covers Britain, was suitable for the work corresponding to that of the special femur and orthopædic hospitals provided by the War Office in the period 1914–18, if only the cases could be evacuated to them in a similar manner. Regarding head and chest cases, I remarked that at present the distribution of surgeons specially skilled in their treatment seemed dictated by chance, and I suggested that in future appointments to the surgical staff of local general hospitals areas should combine to secure the services of such men in reasonable numbers.

I am, Sir, yours faithfully,

M. F. FORRESTER-BROWN, M.S., M.D.

Bath, Somerset, May 27th.

LEFT-HANDEDNESS

To the Editor of THE LANCET

SIR,—The paper on left-handedness by Dr. C. J. Macalister in your last issue (p. 1151) will be welcomed by all who, from medical or educational experience have learned the importance of some of the associations of sinistrality. The suggestion offered by Dr. Macalister that stammering of the type to which he referred was due to imperfect transposition of function in the centres of the two sides of the brain was definitely supported in an investigation on left-handedness in relation to speech defects which I carried out with children of school age. Nearly 5000 boys were examined by means of a series of uni-manual and bi-manual tests, tests for the dominant eye, &c. The different types of dextrality and sinistrality were recorded on Rife's scheme (Psychological Review, 1922, xxix., 474). It was found that the tendency to speech disturbance was definitely related to departure from uni-laterality of function in the native organisation of the nervous system. Taking the whole of the subjects I found that in pure types for handedness (that is, RRR and LLL in Rife's scheme), 2·01 per cent. suffered from speech defects, whereas in the mixed types (LLR, LRR, RRL, and RLL), 11·8 per cent. suffered from speech defects.

"Crossing," which is probably the result of "partial or repressed transposition of the cerebral function," I found definitely increased the tendency to speech defect. All cases of pure dextrals with speech defects were submitted to eye tests and 41·4 per cent. were found to be left-eyed. In addition to the tendency, which others have suggested and this investigation supports, for sinistrality to be associated with a higher proportion of speech disturbances, my results proved that crossing, whether sinistrals with dextro-ocularity or dextrals with sinistro-ocularity, apparently increases the tendency to speech disturbance. If mixed types and crossing are related to imperfect transposition of function to which Dr. Macalister refers, then our data supports his contention. It was also found that nervous disability was two and a half times as frequent in the crossed groups as in the non-crossed groups. This tended to support Quinlan's hypothesis (Arch. Neur. and Psychiat., 1922, vii., 352) that such crossed functioning is evidence of a psychopathic constitution.

Reference is made to cases of "left-handed children who only began to stammer when an attempt was made to convert them into right-hand writers." It would appear from evidence that has been accumulated by various workers on the question that forced change of hand, may, or may not, cause speech defect. I suggest that this is fundamentally related to asymmetry of native organisation, and may be explained on the lines of the hypothesis I offered (Forum of Education, June 2nd, 1929) that speech defect is causally related to mixed types of sinistrality. The suggestion that partial or repressed transposition of the cerebral function "had given no trouble until the upsetting of the balance had been brought about by fright or emotional causes" is in close accord with the theory suggested by Dr. W. S. Inman (THE LANCET, 1924, ii., 211) that left-handedness and stammer have a common origin in some form of mental stress. The left-handed person is "often distinguished by being, to a greater degree than his fellows, self-reliant, critical, and obstinate, refusing to be driven but accepting guidance from those he loves." The forcible restraint upon left-handedness may, therefore, involve psychological difficulties of the greatest importance.

I am, Sir, yours faithfully,

DAVID W. OATES.

Newport (Mon.) Secondary School for Boys, May 29th.

HOSPITAL MANAGEMENT

To the Editor of THE LANCET

SIR,—In THE LANCET of March 31st (p. 704) Mr. Duncan Fitzwilliams is reported to have stated :—

> "that medical schools played an important part in the hospital system but did not make up the whole of it. The pride of the profession in the voluntary system had gone hand-in-hand with a neglect to study hospital management. Hospitals were governed by the finance sub-committee, which in turn was governed by the amount of its bank balance, and every finding of this subcommittee was passed by the complaisant board. The King's Fund had done most to improve matters; the statutory committee had produced an excellent survey, the British Hospitals Association had done nothing at all. . . ."

I have written twice to Mr. Fitzwilliams asking him to let me know upon what grounds he has stated publicly that "the British Hospitals Association had done nothing at all." I have not had the courtesy of a reply.—I am, Sir, yours faithfully,

R. H. P. ORDE,

Hon. Sec. British Hospitals Association.

Grosvenor-crescent, S.W., May 24th.

CHILDREN'S HOSPITALS.—The report for 1933 of the Hospital for Sick Children, Great Ormond-street, shows that 6723 in-patients were admitted, the average number of beds occupied daily was 226, the average weekly cost of each in-patient was £4 1*s.* 1*d.*, and the average total cost of each in-patient was £7 1*s.* 10*d.* There were 28,484 new out-patients whose average cost was 8*s.* 9*d.* A fall in the number of both classes of patients may, it is suggested, be attributed to the higher general standard of health. During the year only £11,655 was collected towards the cost of reconstruction, whereas the board had set out to raise £500,000. The rebuilding of the nurses' home is nearly complete, and an extension of the out-patient department, including a new electrotherapeutic department, has been made.

At the annual meeting of the Victoria Hospital for Children, Chelsea, it was pointed out that while the maintenance of the institution and the convalescent home at Broadstairs costs £25,000 a year, the income from investments is less than £3500. The hospital is anxious to enlarge its accommodation, but it "has never embarked on building operations without the money to pay for them."

Last year the Belgrave Hospital for Children, Clapham, received 1717 in-patients and treated 11,366 out-patients, a reduction in the latter category, attributed to the improved health of the locality and the fine weather. Thanks to legacies, income exceeded expenditure by £1280. The report states that the hospital is not large enough for the needs of the neighbourhood, that the out-patients' department is "lamentably overcrowded," and a nurses' home "an urgent necessity." The average weekly cost of each in-patient was £3 4*s.*

OBITUARY

ANDREW FULLERTON, M.D., M.Ch. Belf., F.R.C.S.I., C.B., C.M.G.

EMERITUS PROFESSOR OF SURGERY, QUEEN'S COLLEGE, BELFAST

WE regret to record the death of Prof. Fullerton, the well-known Belfast surgeon, which occurred on May 22nd in the sixty-sixth year of his age.

PROF. FULLERTON

[*Photograph by Lafayette*

Andrew Fullerton was the third son of the late Rev. Alexander Fullerton, of Dalkey, was born in County Cavan, and was educated at Lurgan College, Belfast, proceeding for his medical training to Queen's College. He faced great difficulties in his early life, being an assistant to a Belfast practitioner while he was a student, and working late at night or early in the morning to keep level with his studies. His industry met with success, for, securing prizes and scholarships, he graduated as M.B., B.S. R.U.I. in 1890 with first-class honours. He now maintained himself by teaching anatomy and surgery and engaging in what general practice fell to him. He came to England and acted for a period as house surgeon at the Miller Hospital, Greenwich, and at the West Kent Hospital, Maidstone, but in 1898 he returned to Ireland, being appointed assistant surgeon to the Belfast Hospital for Sick Children. In 1902 he obtained the diploma of F.R.C.S.I., acted as demonstrator of anatomy at Queen's College, and was elected to the staff of the Royal Victoria Hospital, where he already held the Coulter exhibition. This was to be the main field of his surgical activities in the ensuing 41 years.

Gradually his interests, though remaining broad, became focused on genito-urinary surgery, in which he rapidly became proficient, and on this sphere of his work we may quote the following communication received from Prof. R. J. Johnstone, who writes:

"When Andrew Fullerton became an assistant surgeon to the Royal Victoria Hospital urology was still. from the standpoint of to-day, in an embryonic stage. The *electric cystoscope* had been invented and was being used by a few enthusiasts, but it was regarded by most surgeons as merely another surgical toy. Fullerton saw the possibilities of the instrument, he set himself to learn how to use it and long hours of arduous practice made him its master. As one improvement followed another and the range and the scope of cystoscopy widened. he kept himself abreast. and, by the aid of the instrument of *precision* finally evolved. he was able to make those observations and to draw those deductions which have long ago given him an assured place among the leaders of modern urology. His attitude towards his own specialty was typical of the man. Whatever the subject with which he had *to do,* he was quite content to start as a novice and a learner, but he was never satisfied with anything less than mastery—the best of which he was capable, whether it was the performance of an operation, the delivery of a lecture or of a speech, or the achievement of a drive at golf. He had the passion for perfection, and that quality which has been held to be the mark of genius, an infinite capacity for taking pains."

In 1915 Fullerton went to France with the position of consulting surgeon to the B.E.F.; he was appointed to the Boulogne area in succession to the late Mr. F. F. Burghard, and there his special knowledge of urology and general surgical experience was an asset to the younger surgeons and surgical specialists in the area. In three and a half years' service he was awarded the C.B., C.M.G., and was mentioned thrice in dispatches. In France he came in contact with the McGill and Harvard University units, and after the war was invited to Canada and the United States, where he received the Honorary Fellowship of the American College of Surgeons.

In 1923 Andrew Fullerton succeeded Prof. Thomas Sinclair in the chair of surgery at Belfast, an office which he relinquished only last year. In 1926 he was elected President of the Royal College of Surgeons in Ireland and was reappointed the following year. A distinction which he prized most highly fell to him in 1931, when he was made President of the Association of Surgeons of Great Britain and Ireland. As a surgeon he was best known for his genito-urinary work. He was one of those who stressed the value of unilateral diuresis in obscure cases where other methods of examination proved negative. He modified the technique of prostatectomy from time to time and was a firm adherent to the Freyer type of operation with suprapubic enucleation at one stage, and had reduced his mortality to about 5 per cent. In his ward he took great pains with the case-notes and himself kept a record of both hospital and private cases. This extended back to his days as resident in hospital, and at the time of his death he had full records of some 3600 cystoscopies alone. No day was complete until he had written up his case-notes. As a writer he published over 50 papers of surgical interest, the articles on gunshot wounds of the kidney and ureter finding a place in the official medical records of the war.

With such a record it is not to be wondered that the man Andrew Fullerton had an arresting personality, and he possessed also a most likeable disposition. As in the war, so in civil life he was always kindly, considerate, and helpful to the student or young doctor who regarded him as a personal friend and loved him for his enthusiasm and guilelessness. His enthusiasm was infectious, and no one could work for him without sensing it and feeling the better for it. On his retirement his students gave him a remarkable testimony of their goodwill and devotion to a popular teacher. With all his activities Andrew Fullerton found time to enjoy his private life. He was a warm host and had a large circle of friends and was a prominent freemason. Golf was his chief recreation, and for the past two years he was captain of the Royal County Down Club at Newcastle.

Dr. J. C. Rankin writes appositely here:—

"Prof. Fullerton's operative and consulting work, together with his very careful and elaborate case-taking, left him with little time for other pursuits. His mind was always centred on his work, so that at times he may have seemed abrupt in his manner, but in lighter moods he could relax very completely.

At golf, his favourite recreation, he played keenly, never admitting defeat till the last put, and while a modest winner he was a most cheerful loser. At bridge, though his calls were at times optimistic, he brightened up the game and always made the best of his hand. He was an asset to any party, and, as generous host, he entertained many distinguished visitors to our school. In all he did he put his whole heart."

Prof. Fullerton was married twice, and is survived by his widow and the two sons and daughter of the first marriage.

OTTO JACKSON KAUFFMANN, M.D., F.R.C.P.

EMERITUS PROFESSOR OF MEDICINE, UNIVERSITY OF BIRMINGHAM

THE sudden death occurred on May 15th, at his house at Edgbaston, Birmingham, of Otto Kauffmann, emeritus professor of medicine and consulting physician to Queen's Hospital, Birmingham.

Otto Kauffmann when only 15 lost his father and was brought up by his mother, to whom he was devoted, and who lived with him until her death at the age of 89. He received his early education at Owens College, Manchester, and completed his medical curriculum at St. Mary's Hospital, London. Taking the M.R.C.S. in 1885, in the following year he graduated M.B. Lond. and M.B. Manch. Two years later he proceeded to the M.D. degree, London, when he qualified for the gold medal. He proceeded to hold many residential appointments; he was house physician at the Brompton Consumption Hospital, at the Seamen's Hospital, Greenwich, and at the Manchester Royal Infirmary, where he later became resident medical officer. In 1893 he was elected to the staff of Queen's Hospital, Birmingham, and his appointment to the chair of pathology attached to Mason University College followed.

PROF. KAUFFMANN

[*Photograph by A. C. Cooper*

For a long period he was a prominent figure in the medical school of the university, and in 1913 was elected professor of medicine, a post that he occupied with distinction for 13 years, during the closing period being chairman of the clinical board. This period corresponded with the years of the war, and while discharging his hospital and academic duties he did excellent work, with the rank of Lieut.-Colonel, R.A.M.C., at the first Southern General Hospital.

Kauffmann displayed in the Ingleby lectures, which were delivered in 1900 and published in these columns, his particular interest in many phases of neurology. He dealt with the common neuroses of childhood, and although much addition to our knowledge has been gained in the interval, his appreciation of the real nature of many of the conditions formed useful steps in the increasing comprehension of the causation of many of these neuroses. His observations were carried out in a thorough manner, and his main arguments remain sound. He was not a controversalist and relied for his teaching on his experiences in clinical medicine. In 1921 the Association of Physicians of Great Britain met at Birmingham, when election as president proved the opinion of his work formed by the leaders of scientific medicine. He also served the British Medical Association in many capacities, having been, at different annual meetings, vice-president of the section of pathology, while at the meeting in 1911, at Birmingham, he presided over the section of diseases of children.

The following appreciation comes from a colleague of Kauffmann: "It is permitted to comparatively few to have so little illness as clouded the 71 years of Otto Jackson Kauffmann's life. His good health was no doubt the secret of his youthful appearance. It will be a surprise to his friends to learn that he was born in 1863. He died, without suffering, from cerebral thrombosis in the midst of all his activities. He was a most gifted and cultured man with a very philosophical and analytical mind. He was a great reader, but the modern novel was anathema to him. Books on travel, biography, astronomy, and navigation interested him most, he was a great lover of Shakespeare, and well versed in French and German literature, both lay and medical. It is a matter of great regret that one so eminently fitted to write on medical subjects should have made so few contributions to the literature, but, perhaps, in becoming critical of others he had become too self-critical to express definite views. Mathematics and music are said to appeal to the same mentality and this was certainly true of Kauffmann. He was never happier than when engaged in trying to solve some mathematical problem, or when left to the companionship of his violin. He was a very keen violinist and for years had been in the habit of forming one of a quartette that met every week at his house.

"Kauffmann had an amazing command of English and would put this to good use whenever he spoke in public. He was an interesting lecturer but it was in the wards of the Queen's Hospital, Birmingham, that he was in his element. He always attracted a large number of students. To these he gave of his best and, as he was both thorough and methodical, his teaching was of the utmost value. He loved teaching and delighted in unravelling the medical problems that presented themselves in the wards. He visited the hospital on most days; Saturdays, however, never saw him there, for in the winter he hunted every Saturday and, for many years, he was a well-known figure at meets in the Midlands. He made up for his absence in the wards on the sixth day by his presence there on the seventh, and every Sunday morning would find Kauffmann in the wards surrounded by a number of practitioners discussing knotty medical problems. This Sunday meeting, to which he used to refer as his Sunday-school, may be said to have been the origin of post-graduate teaching so far as Birmingham is concerned. It was very popular with the doctors attending, but not so popular with the resident and nursing staffs, as may be readily imagined. His recreations were hunting in winter and yachting in summer. He sailed his yacht without paid hands and knew every mile of the coast of Cornwall, Devon, and the Scilly Isles, and many parts of Scotland and Ireland."

Professor Kauffmann married Rosalind, the granddaughter of Mr. Justice Crumpton, and leaves a widow, a daughter, and two sons, the elder of whom is training for the medical profession.

MEDICAL NEWS

University of Cambridge

On May 26th the following degrees were conferred :—

M.D.—W. S. Maclay, M. D. Nosworthy, R. W. Windle, and J. B. S. Lewis.

M.B. B.Chir.—G. W. Whittall and E. R. Hargreaves.

M.B.—J. G. Jones.

B.Chir.—C. M. Barker.

Dr. G N. Myers has been appointed university demonstrator in pharmacology, and Dr. H. A. Krebs in biochemistry.

The E. G. Fearnsides scholarship for clinical research on the organic diseases of the nervous system is open to men or women who are graduates of the university in medicine or who have passed part II. of the natural sciences tripos after graduation in arts. Applications should be sent to the university registrary before June 27th.

Society of Apothecaries of London

At recent examinations the following candidates were successful :—

Surgery.—P. E. Cresswell, Univ. of Oxf. and Guy's Hosp. ; M. T. Curran, Univ. of Leeds ; R. Fleming, London Hosp. ; S. Kay, Univ. of Toronto ; S. Klein, Univ. of Vienna and St. Mary's Hosp. ; R. Sugerman, Univ. of Basle and Royal Free Hosp. ; C. E. Wetherall, Royal Free Hosp. ; and W. E. Whaite, Univ. of Manch.

Medicine.—P. C. Alexander, Univ. of Oxf. and Guy's Hosp. C. N. Chowdary, Univ. of Durham ; G. W. Hardy, St. Mary's Hosp. ; C. C. Joannides, Univ. of Graz and Westminster Hosp. ; S. Kay, Univ. of Toronto ; A. G. Manley, St. Mary's Hosp. ; J. Mason, Middlesex Hosp. ; S. E. Roberts, Guy's Hosp. ; and E. C. Rowlands, St. George's Hosp.

Forensic Medicine.—P. C. Alexander, Univ. of Oxf. and Guy's Hosp. ; F. M. Chalkley, Charing Cross Hosp. ; M. V. Matthew, Univ. of Manch. ; and M. A. Walsh Conway, Charing Cross Hosp.

Midwifery.—A. E. Ginn, Guy's Hosp. ; L. A. Lewis, King's Coll. Hosp. ; and H. Paroulakis, Univ. of Innsbruck and St. Mary's Hosp.

The following candidates, having completed the final examination, are granted the diploma of the society entitling them to practise medicine, surgery, and midwifery : P. C. Alexander, A. E. Ginn, G. W. Hardy, S. E. Roberts, E. C. Rowlands, R. Sugerman, and C. E. Wetherall.

University of London

Applications are invited for the Laura de Saliceto studentship for the advancement of cancer research. Particulars will be found in our advertisement columns.

University of Liverpool

Dr. Henry Cohen, lecturer in medicine in the university and physician to out-patients at the Liverpool Royal Infirmary, has been appointed to the chair of medicine as from Oct. 1st. in succession to Prof. John Hay, who retires at the end of the present session.

Dr. Cohen, who was born in 1900, was educated at Birkenhead Institution and Liverpool University, where he had a distinguished career as a student. [illegible] in 1922 with first-class honours and two [illegible] to the M.D. degree, with special merit. A[illegible]ointments at the Royal Infirmary he be[illegible]nd registrar there. He has held the Samu[illegible] and in 1924 a Beit memorial research fell[illegible] he was admitted to membership of the Royal College of Physicians of London, and this year he was elected a fellow.

International Anthropological Congress

The first session of the International Congress of Anthropological and Ethnological sciences will be held in London from July 30th to Aug. 4th. Meetings will take place at University College, Gower-street, W.C., and at the Wellcome Historical Medical Museum, Euston-road. The chairman of the section of anatomy and physical anthropology will be Prof. G. Elliot Smith, F.R.S, and the chairman of the section of sociology Prof. C. G. Seligman, F.R.S. The other sections will be devoted to psychology, demography and population problems, technology, religions, and language and writing. The president of the congress is Lord Onslow, and the secretaries should be addressed c/o The Royal Anthropological Institute, 52, Upper Bedford-place, W.C.1.

Vacation Course in Paris

A vacation course in medical therapeutics and hydrology will be held from June 18th to 30th at the Hôpital Necker, and a tour to Royat and Saint-Nectaire has been arranged for June 30th to July 1st. Further particulars may be had from the secretary of the faculty of medicine of the university. Prof. Maurice Villaret is acting as director.

Indian Medical Service Annual Dinner

This dinner, as already announced, will be held at the Trocadero Restaurant, London. on Wednesday, June 20th, at 7.15 for 7.30 P.M. Major Sir Leonard Rogers will preside, and officers can arrange to sit near their friends as separate tables to seat eight will be provided. Tickets from the joint hon. secretary, Sir Thomas Carey Evans, Hammersmith Hospital, Ducane-road, W.12.

Coming Sales of London Hospital Sites

Presiding at the annual court of governors of St. George's Hospital last week, Prince George stated that the site must be sold and a new building erected within the next four or five years. "Everything about the hospital except the wards," he added, "is out of date and quite unfit for modern requirements." Sir Crisp English, consulting surgeon to the hospital, urged immediate action on the ground that the institution is rapidly reaching a crisis. He described the site as "the best in London."—The site and buildings and the various annexes of Westminster Hospital are now bring advertised for sale.

National Birth Control Association

A conference on birth control for general nurses, public health workers, and midwives will be held at the College of Nursing, Henrietta-street, London, W., on Friday, June 15th. In the morning, under the chairmanship of Lord Horder, Mr. Claude Mullins will speak on the ethics of birth control, and Mrs. Stocks on birth control and the public health service. In the afternoon Lady Denman will take the chair, and Dr. Helena Wright will give a lecture on the technique of birth control, and Mr. Cedric Lane-Roberts on the contribution of the nursing profession. Tickets can be obtained from the secretary of the Association, 26, Eccleston-street, London, S.W.1.

Royal National Pension Fund for Nurses

At the annual meeting last week Sir Eric Hambro, the chairman, said that for the third year in succession the fund had made a record. Whereas in 1931 the policies issued numbered 1501, last year they reached 2438. The premium income in 1933 was £262,000, an increase largely due to many nurses having paid single premiums for the purchase of immediate or deferred annuities. Last year the single premiums amounted to £147,000. Sir Eric added that during the year the fund increased by £206,000, and on Dec. 31st last amounted to £2,700,000, of which £1,460,000—or more than 54 per cent.—was invested in British Government securities. The fund was now paying annuities at the rate of £144,000, and the number of annuitants was more than 4000. After deducting tax and allowing for refunds the net rate of interest earned for the year on the annuity and life fund was £4 18*s*. 3*d*. per cent.

Liverpool Hospital for Consumption and Diseases of the Chest

The report for 1933 of Dr. E. T. Baker-Bates, the stipendiary medical officer, shows that there were 131 patients under treatment (81 females and 50 males), whose average residence was 91 days. There were 98 "discharges," which included 25 deaths. On admission there were 78 per cent. of advanced, 18 per cent. of moderate, and only 4 per cent. of early cases. Advanced cases after admission "show a certain degree of improvement, hold their own for a time, and then gradually lose ground ; such patients eventually become bedridden and helpless." The radiological examination of contact cases of pulmonary tuberculosis has been found to be of the greatest value.

PARLIAMENT

NOTES ON CURRENT TOPICS

Reassembly after Whitsun

THE House of Commons reassembled after the Whitsuntide recess on Tuesday, April 29th.

Milk for School-children

The Children's Minimum Organising Committee has circulated to Members of Parliament a memorandum criticising the Government's proposals for assisting the milk industry. The committee, which has the support of 32 organisations, emphasises the value of increasing consumption of liquid milk in schools as opposed to the encouragement of further production of milk for manufacture. The present proposals provide for the supply of milk to schools at ½d. for a third of a pint, and "it is estimated that under this scheme cheap milk could be supplied on schooldays to only 2–2½ million out of the 6½ million children attending elementary schools." Moreover, none would be available for children under 5 or for expectant and nursing mothers, or for school-children during the holidays. As an alternative the committee desires that "the Government should use whatever money is available as a direct grant to local education authorities to provide a daily ration of clean milk in elementary schools for all children who can take it." Local authorities should also be obliged to supply milk for children under 5 and for expectant and nursing mothers in households where the family income falls below a sum necessary to maintain full health. If this alternative is not adopted the committee urges that it shall at least be made compulsory on all local education authorities to supply free milk to necessitous children.

Restoration of Salary Cuts

On May 29th the House of Commons considered in Committee the Statutory Salaries (Restoration) Money Resolution.

Mr. CHAMBERLAIN (Chancellor of the Exchequer), in moving the resolution, said that abatements which were made in salaries and allowances in 1931 would be restored by one-half by administrative action where that was possible. Certain salaries, however, were fixed by Statute, which required legislation to restore abatements, and the resolution was moved to enable the legislation to be introduced. The first paragraph of the resolution went further than was necessary to restore half the abatements made in 1931, and would authorise a Bill to restore the other and second portion of the abatements at some future time, if it was thought desirable to do so, without the necessity for further legislation. There was no intention of restoring to the full all the cuts made in 1931 in this particular financial year. They would have to wait their turn until a full restoration could be made everywhere; then they would all come together.

The resolution was agreed to.

HOUSE OF COMMONS

TUESDAY, MAY 29TH

Duties on Scientific Publications

Captain CUNNINGHAM-REID asked the President of the Board of Trade if he would consider excluding from the operation of the Additional Import Duties (No. 6) Order, 1934, the publications of learned and scientific societies.—Mr. HORE-BELISHA (Financial Secretary to the Treasury) replied: The question of excluding the publications of learned and scientific societies from the operation of the Additional Import Duties (No. 6) Order, 1934, is one, in the first instance, for the consideration of the Import Duties Advisory Committee, to whom any representation should be made by the parties concerned.

Medical Diary

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

WEDNESDAY, June 6th.

Surgery. At the Mount Vernon Hospital, Northwood. 4.30 P.M. Demonstrations: Dr. Malcolm Donaldson, Mr. S. Cade, Mr. W. D. Harmer, Mr. G. L. Keynes, Mr. D. C. L. Fitzwilliams, Mr. B. W. Williams, Dr. G. C. Fairchild, and Dr. J. C. Mottram.

FRIDAY.

Ophthalmology. 5 P.M. (Cases at 4.30 P.M.) Annual General Meeting. Mr. A. C. Hudson and Sir William Lister: Hypernephroma of Iris. Miss M. A. Pugh: The Significance of False Projection in Squint. Cases will be shown.

Laryngology, Otology. Summer Meeting at Birmingham. 10 A.M.–12.30 P.M., at the Medical Institute: Discussion on the After-treatment of Facial Palsy to be opened by Sir Charles Ballance on Nerve Anastomosis, and Sir Harold Gillies on Treatment by Fascia Lata Slings. 2.30 P.M.–4.15 P.M. Mr. Steven Jones: Normal Phonation and Articulation. Mr. V. E. Negus: Disorders of Phonation. One demonstration: Miss Freda Parsons: Speech Re-education Methods.

SATURDAY.

9.30 A.M.–12.30 P.M., at the Board Room, General Hospital. Cases: Sir Harold Gillies, Mr. W. S. Thacker-Neville, Mr. C. Hamblen Thomas, Mr. Harold Round, and Prof. Lockhart.

RESEARCH DEFENCE SOCIETY.

TUESDAY, June 5th.—3 P.M. (at the London School of Hygiene and Tropical Medicine, Keppel-street, W.C.), Prof. J. Barcroft: Experiments on Man (Stephen Paget Memorial Lecture).

SOUTH-WEST LONDON MEDICAL SOCIETY.

WEDNESDAY, June 6th.—9 P.M. (at the Bolingbroke Hospital, Wandsworth), Mr. Comyns Berkeley: Some Things I Have Learnt (Bolingbroke Lecture).

BIOCHEMICAL SOCIETY.

FRIDAY, June 8th.—2.30 P.M. (Institute of Physiology, Glasgow): Communications.

SATURDAY.—Visit to Hannah Dairy Research Institute, Ayr, in the morning: and to Marine Biological Station, Millport, in the afternoon.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.

TUESDAY, June 5th, and following THURSDAY.—5 P.M., Prof. O. L. V. S. de Wesselow: On Arterial Hypertension (first two Croonian Lectures).

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, London, W.

MONDAY, June 4th, to SUNDAY, June 10th.—CHELSEA HOSPITAL FOR WOMEN, Arthur-street, S.W. All-day Course in Gynæcology.—LONDON LOCK HOSPITAL, 91, Dean-street, W. Afternoon Course in Venereal Disease.—CITY OF LONDON MATERNITY HOSPITAL, City-road, E.C. Week-end Course in Obstetrics: all day, Sat. and S [illegible] LONDON, 11, Chandos-stree [illegible] re on Poor Circulation [illegible] r, at 2.30 P.M. on Tues. [illegible] ITAL, Hampstead-road, N.W. Lantern lecture-demonstration on surgical cases by Mr. Hamilton Bailey at 3 P.M. on Sat.—PANEL OF TEACHERS. Individual clinics in various branches of medicine and surgery are available daily. Courses of instruction arranged by the Fellowship of Medicine are open only to Members and Associates.

UNIVERSITY OF BIRMINGHAM.

TUESDAY, June 5th.—3.30 to 5 P.M. (at the General Hospital), Prof. Seymour Barling: Demonstration of Surgical Cases.

FRIDAY.—3.30 to 5 P.M., Dr. Hugh Donovan: Urinary Infections and the Ketogenic Diet.

LEEDS GENERAL INFIRMARY.

TUESDAY, June 5th.—3.30 P.M., Dr. Vining: Children.

DONATIONS AND BEQUESTS.—From Smith's Charity the Royal National Orthopædic Hospital has received a donation of £1000, and King's College Hospital from the same charity a special grant of £500 towards the completion of the nurses' home, and a gift from a citizen of Lambeth of £1000 towards the reduction of the debt of over £60,000.—By the will of the late Dr. J. T. Rogerson, of the Isle of Man, the Victoria University of Manchester will receive ten £100 five per cent. first mortgage debentures of the Trafford Park Estates, Ltd., and benefit by part of the residue of the estate.—The late Mrs. Mary G. Letford, of Ramsgate, left £1000 to the Star and Garter Home for Disabled Soldiers and Sailors, Richmond, to endow "The Louis George Letford Bed," and £500 to the Ramsgate General Hospital and Seaman's Infirmary to endow "The Louisa Worthington Cot."

Appointments

Kirby, M., M.B., Ch.B. N.U.I., has been appointed Asst. County M.O.H., Dublin.

Mill, W. A., M.S. Lond., F.R.C.S. Eng., Laryngologist to the Cancer Hospital (Free).

Moncrieff, Alan A., M.D., F.R.C.P. Lond., Physician to Out-patients, at the Hospital for Sick Children, Great Ormond-street, London, W.C.

Risk, R. S., M.B., B.S. Lond., Resident Medical Officer at the Queen's Hospital for Children, Hackney-road, E.

Simpson-Smith, A., M.Chir. Camb., F.R.C.S. Eng., Surgeon to the Hospital for Sick Children, Great Ormond-street, London, W.C.

West London Hospital: Gordon, H., B.Chir. Camb., Dermatologist; and Hasler, J. K., M.B., B.S. Lond., Assistant Anæsthetist.

Certifying Surgeons under the Factory and Workshop Acts: Ashton, J. C., M.B., Ch.B. Edin. (Corris, Montgomeryshire); and How, G. R., M.B., Ch.B., St. And. (Kilbirnie, Ayrshire).

Vacancies

For further information refer to the advertisement columns

Bagdad, Royal College of Medicine.—Chair of Materia Medica.

Bath, Royal United Hospital.—Hon. Med. Reg.

Beckenham, Bethlem Royal Orchard, Monks Orchard.—Sen. Asst. Phys. £700.

Blackburn Royal Infirmary.—Res. Cas. O. £150.

Bristol Royal Infirmary.—Hon. Physician, Hon. Asst. Phy., Hon. Reg. to Orthopædic Dept. Also Hon. Anæsthetist.

Bristol, Winford Orthopædic Hospital.—Hon. Dental Surgeon.

Cambridge University.—E. G. Fearnside's Scholarship for Clinical Research, &c.

Cancer Hospital, Fulham-road, S.W.—H.S. At rate of £100. Also Second Asst. Pathologist. £250.

Cardiff Royal Infirmary.—H.S. for Ear, Nose, and Throat Dept. £100.

Central London Throat, Nose, and Ear Hospital, Gray's Inn-road, W.C.—Assts. for Out-Patient Dept.

Charing Cross Hospital Institute of Pathology, W.C.—Part-time Bacteriologist and Hæmatologist. At rate of £250.

Chesterfield, Walton Sanatorium.—Locum Res. Asst. M.O. At rate of £350.

Connaught Hospital, Walthamstow, E.—H.S. At rate of £100.

Dewsbury and District Infirmary.—H.S. £150.

Dreadnought Hospital, Greenwich, S.E.—H.P. and H.S. At rate of £110.

Durham C.C.—District Tuber. M.O. £500.

Evelina Hospital for Sick Children, Southwark, S.E.—H.P. At rate of £120.

Gloucester, Gloucestershire Royal Infirmary, &c.—Res. H.P. and Res. H.S. Each at rate of £150.

Great Yarmouth General Hospital.—H.S. £140.

Guy's Hospital, London, S.E.—Asst. M.O. to Salomon's Infant Welfare Centre. At rate of £78. Also Ophthalmic Surgeon.

Hampstead General and N.W. London Hospital, Haverstock Hill, N.W.—H.S. At rate of £100.

Hampstead Metropolitan Borough.—Public Vaccinator.

Hospital for Sick Children, Great Ormond-street, W.C.—Physician to Skin Department.

Hospital for Tropical Diseases, Gordon-street, W.C.—H.P. At rate of £120.

Hull Royal Infirmary.—Third H.S. At rate of £150.

Ilford, King George Hospital.—Cas. O. At rate of £130.

Ipswich, East Suffolk and Ipswich Hospital.—H.P. £120.

Lancashire C.C., School Medical and Child Welfare Dept.—M.O. £800.

Lancaster, Royal Albert Institution for the Feeble-minded.—Jun. Asst. M.O. £430.

L.C.C.—Radiologist. £1500.

London Hospital, E.—Physician.

London Missionary Society.—Medical Woman for Jiaganj, N. India.

London University.—Chair of Obstetrics and Gynæcology. £2000. [illegible] Also Laura de Saliceto Studentship. £150.

[illegible] *Hospital for Women and Children.*— [illegible]

Manchester Royal Children's Hospital.—Asst. Surgeon. £50.

Mansfield, Notts, Harlow Wood Orthopædic Hospital.—Two H.S.'s. Each at rate of £175.

Metropolitan Ear, Nose, and Throat Hospital, 2, Fitzroy-square, W.—Asst. Surgeon.

Middlesbrough, North Riding Infirmary.—H.P. At rate of £125.

Mildmay Mission Hospital, Austin-street, Bethnal Green.—Asst. Cas. O. At rate of £125. Also Jun. Res. M.O. At rate of £100.

Nelson Hospital, Merton, S.W.—Res. H.S. At rate of £100.

Norwich, Norfolk and Norwich Hospital.—H.P., H.S., and H.S. to Spec. Depts. Each £120.

Penshurst, Cassel Hospital for Functional Nervous Disorders, Swaylands.—Medical Director. £1000.

Plymouth, South Devon and East Cornwall Hospital.—H.P. and H.S. Each at rate of £120.

Preston County Borough.—Asst. School M.O. £500.

Queen Charlotte's Maternity Hospital, Marylebone-road, N.W.—Two Res. Anæsthetists. Each £100.

Queen's Hospital for Children, Hackney, E.—H.P. and Cas. O. Each at rate of £100. Also Surgeon for Ear, Nose, and Throat Dept.

Royal Dental Hospital of London, Leicester-square, W.C.—Hon. Pathologist.

Royal London Ophthalmic Hospital, City-road, N.—Hon. Asst. Phys.

Royal Northern H[illegible] rate of £70.

Ryde, Royal Isle [illegible] H.S. £180.

St. Peter's Hosp[illegible], *W.C.*—Hon. Clin. Assts. to Out-Patient Dept.

Salford Royal Hospital.—Med. Reg. £250. Also H.P. and H.S. Each at rate of £125.

Salvation Army, Mothers' Hospital, Lower Clapton-road, E.—Jun. Res. M.O. At rate of £80.

Sheffield Children's Hospital.—H.S. At rate of £100.

Sheffield, Jessop Hospital for Women.—Two H.S.'s. Each at rate of £100.

Stockport Infirmary.—H.S. £150.

Stoke-on-Trent, North Staffordshire Royal Infirmary.—Hon. Radiologist. Also H.S. At rate of £150.

Weir Hospital, Grove-road, Balham, S.W.—Jun. Res. M.O. £100.

Western Ophthalmic Hospital, Marylebone-road, N.W.—Jun. Res. H.S. At rate of £100.

West London H[illegible] H.P., H.S. and Res. Anæ[illegible]

Wigan Royal I[illegible]

Winchester Royal Hampshire County Hospital.—H.S. At rate of £125.

Wolverhampton Royal Hospital.—H.S. for Ear, Throat, and Nose Dept. At rate of £100.

Wolverhampton and Midland Counties Eye Infirmary.—H.S. £150.

Wolverhampton, New Cross Hospital.—Asst. Res. M.O. £200.

The Chief Inspector of Factories announces vacant appointments for Certifying Factory Surgeons at Oakengates, Salop, and at Filey, Yorks.

Births, Marriages, and Deaths

BIRTHS

Baynes.—On May 21st, at Reed House, Old-avenue, West Byfleet, the wife of Dr. H. Godwin Baynes, of a son.

Darley.—On May 23rd, at Trory Cottage, Claygate, Surrey, the wife of Rupert D. Darley, M.B., B.S. Lond, of a daughter.

Gibson.—On May 26th, at Muntham, Torquay, the wife of P. C. Gibson, M.D., of a daughter.

Langmaid.—On May 25th, at Southsea, the wife of Dr. F. Rodney Langmaid, of a son.

McLaggan.—On May 30th, 1934, at 27, Welbeck-street, to Elsa, wife of J. Douglas McLaggan, F.R.C.S.—a son.

Morland.—On May 27th, at Cook's Hill, Mundesley, the wife of Andrew Morland, M.D., of a son.

Owen.—On May 24th, the wife of Charles Langley Owen, F.R.C.S. Eng., of Tregony, Cornwall Gardens, Cliftonville, of a daughter.

Polson.—On May 24th, at the Imperial Nursing Home, Harrogate, the wife of Dr. Cyril Polson, of a daughter.

Ratcliffe.—On May 22nd, the wife of James Rudd Ratcliffe, F.R.C.S. Eng., of Derby, of a son.

MARRIAGES

Graham—Batson.—On May 24th, in London, C. I. Graham, F.R.C.S., to Evelyn Marjorie Batson, of Rodwell, Weymouth second daughter of the late Dr. and Mrs. W. L. Batson, of Dorking.

DEATHS

Cooke.—On May 23rd, at Alverthorpe, Ripley-road, Worthing, Dr. John Benson-Cooke, aged 82.

Fullerton.—On May 22nd, Andrew Fullerton, C.B., C.M.G., F.R.C.S.I., of University-square, Belfast.

Hurlbutt.—On May 25th, at Collingham-road, S.W., Spencer Hurlbutt, M.R.C.S., L.R.C.P.

Kauffmann.—On May 15th, after a very short illness, at his residence, Hermitage-road, Edgbaston, Birmingham, Otto Jackson Kauffmann, M.D., F.R.C.P., Emeritus Professor of Medicine, University of Birmingham, aged 71 years.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Kent and Canterbury Hospital.—It has been decided to rebuild this hospital with about 150 beds on a site at South Canterbury at a cost roughly estimated at £100,000, of which it is expected that £84,000 will be available by the end of this year. The scheme includes beds for paying patients and a nurses' home to accommodate the entire nursing staff; the nurses are at present "billeted all over the city." Dr. Harold Wacher describes the present out-patient department as "chaos" and the dental, bacteriological, and orthopædic departments as housed in "miserable buildings showing ominous signs of decay."

NOTES, COMMENTS, AND ABSTRACTS

A SURGICAL PILGRIMAGE TO ROME

By H. S. Souttar, C.B.E., F.R.C.S.
SURGEON TO THE LONDON HOSPITAL

It is always difficult to assess the value of an experience or to define precisely what it has taught us, and in nothing is this more striking than in a visit to a foreign clinic. We see a number of hospitals quite different from our own, and doctors working under conditions as foreign to us as are their countries, and one perhaps watches a series of operations and admires the dexterity and success with which they are performed. Perhaps one picks up a few ideas on organisation, or hints for an improved technique, but one comes away with a feeling that one has gained something of greater importance than such details as these, something indefinable and incommunicable which has made the journey well worth while.

This was undoubtedly true of a small party of Pilgrim Surgeons who left London one morning last February on a visit to Rome. Early on Monday morning, after 32 hours' travelling, we met Prof. R. Bastianelli at his private clinic in the Viale Regina Margherita. We were taken to his library surrounded by surgical journals in every language, and we were shown a series of perfect case records extending back over many years. We were introduced to the secretary-artist who keeps the records and makes coloured drawings of all the more important cases. The drawings were all of exceptional perfection and formed a fitting record of a splendid surgical technique. The clinic is the private property of Prof. Bastianelli, it contains 50 beds and is fitted with the most modern equipment in every direction. It is staffed by three assistants and a large nursing establishment.

Prof. Bastianelli performed an operation upon an old case of suppurative cholecystitis with perforation of the duodenum and colon. The case was one of great difficulty and the gall-bladder was removed with remarkable skill under perfect local anæsthesia. This was followed by a gastrectomy for duodenal ulcer. An interesting point in technique was the stripping of the vessels from the greater curvature and the separate ligature of the anterior and posterior groups. A great point was made of the actual removal of the ulcer, accomplished with some difficulty, since it had involved the pancreas. The duodenal stump was closed and a retrocolic Polya anastomosis performed. This operation also was under local anæsthesia.

Tuesday morning we spent at the Policlinico Umberto I with Prof. R. Alessandri. This enormous hospital with over 2000 beds was opened 35 years ago, and the writer actually saw it before it was opened. It was then intended to take 4000 patients, and it was rightly regarded as one of the medical wonders of the world, built on the pavilion system on a single corridor 900 metres in length. It was then thought that it would never be filled and the number of beds was curtailed, but so rapidly has Rome advanced that it is now considered quite inadequate to its needs and has been supplemented by several other large hospitals. We saw three operations performed by Prof. Alessandri under local or regional anæsthesia. The first was an exploration of the parathyroids in a case of spondylitis ossificans, on which disease Prof. Alessandri has done some interesting work. This was followed by a cholecystectomy under local anæsthesia, and a nephrectomy for a tuberculous kidney under extradural anæsthesia produced by the injection of 1 in 1000 solution of percaine in the upper lumbar region outside the dura.

After the operations we were taken to a fine lecture theatre where we were shown a series of cinematograph films illustrating points in operative technique. We were told that the university possesses a large stock of these films and that they are extensively used in teaching students.

On Wednesday morning we visited the Istituto Regina Helena, called the "House of Tumours," and devoted to the study of the causation and treatment of tumours of every kind. It is really a complete hospital with 250 beds arranged in small wards and private rooms. There is an X ray department complete in itself for early diagnosis and treatment, and both the hospital and its X ray department are equipped in a most lavish and up-to-date manner. Attached to this is a research institution with facilities for experimental research of every kind. The roof is devoted to animal houses, and one large room is specially equipped for culture of living tissues. Although the laboratories are already complete, the only appointment so far made is that of Prof. Bastianelli to the directorship. In the hospital itself we were specially impressed by the X ray department equipped with double diagnostic sets of the latest type, and with double treatment sets operating at 250 k.v.

From here we went on to the Ospedale di Littore where we met Prof. A. Chiasserini. We saw him perform an extraperitonal resection of the left lumbar sympathetic in which he obtained an admirable exposure through an oblique lateral incision, and a laparotomy for a duodenal ulcer. He afterwards showed us a large number of specimens of gastrectomy, an operation which he invariably performs for all duodenal as well as gastric ulcers. We saw several of his cases of recent date and were much impressed by the results.

In the evening we had the pleasure of entertaining at dinner a few of the leading medical men of Rome, when Prof. G. E. Gask, who was the leader of our party, gave a message of greeting from the President of the Royal College of Surgeons of England to Profs. Bastianelli and Alessandri, honorary Fellows of the College. Prof. Bastianelli replied in a charming speech, in which he congratulated the Pilgrims on having at last found in Rome a true object for their pilgrimage.

The Pilgrims returned full of enthusiasm for all that they had seen and for the kindness with which they had been received on every hand.

Looking back over 35 years to a former visit, I found Rome itself to show many changes. The beggars and the slums have gone and everywhere one sees evidences of a new life and of a new spirit. No city in the world can point to the memory of such a glorious past; may the future hold for her an equal prosperity.

A MUNICIPAL CHILDREN'S HOSPITAL

Ever since the supersession of the boards of guardians the county borough of Middlesbrough has been at work upon a comprehensive scheme of reorganisation of the town's hospital and kindred services. Among its inheritances from the guardians was the Broomlands (Children's) Hospital, then more than 30 years old, which it soon became evident could be made to serve its purpose efficiently only by a serious expenditure. There was, however, another and more promising building in the possession of the town council which it was decided to modernise and adapt as a children's hospital. This has now been done at a cost of £2500, and the new institution was opened last week. The exterior of the building is admittedly rather grim, and it might have been supposed that its first vicissitudes would make its conversion a matter of difficulty. Originally two buildings erected as children's homes, there was a surrounding high wall which did not make for cheerfulness. Presently the wall was demolished, and, going from one end of life to the other, the building became a home for aged women. After the war it was leased by the corporation from the guardians and turned into flats, but eventually the tenants jibbed at the high rents which, in the end, they refused to pay. Then the guardians used it as a hospital for midwifery and female medical cases until that body receded into history.

The adaptation has been skilfully accomplished, and the building now contains four ground-floor wards, two large and two small, which can be converted into open-air wards by opening the French windows, five small wards and a large one on the first floor with an operating theatre and the necessary accompaniments of a complete hospital on a small scale, including a plaster room and an operating theatre. The building looks out upon a lawn, and there is a veranda for camp beds that delicate children may obtain all the available sunlight and fresh air. The wards, which will accommodate 82 beds, are painted in varying pastel shades and have oak floors. An essential part of the hospital is a school with a fully qualified whole-time teacher who holds classes in the wards for cases of long duration. It is claimed that the hospital will substantially reduce the cost of administration, and it certainly appears to be a promising example of what can be done by the coördination of hospital activities.

PREVALENCE OF CONTRACEPTIVE METHODS

THE reports of the International Medical Group for the Investigation of Contraception take stock periodically of the progress of birth-control knowledge throughout the world. In the current issue, the fifth of the series,[1] the contributions treat of developments, both in the *technique* of contraception and in knowledge of the distribution of its practice, that have occurred in Great Britain, the United States, Denmark, and Russia since the publication of the previous report in 1931; and of the rise and overnight collapse of the birth-control movement in Germany within the same period.

Perhaps the most generally interesting, as it certainly is the most illuminating, contribution is the full summary by Dr. C. P. Blacker—who, as secretary to the Birth Control Investigation Committee, is responsible for the report—of three statistical studies which deal with the contraceptive practices of a group of English women (mainly middle-class), and of two groups of women in America, one belonging to the relatively intelligent and educable class that avails itself of the services of birth control clinics, the other a group of women who had been delivered of babies in maternity hospitals and belonged for the most part to the poorest and least literate elements of society. In the English group, a method of which the sheath was an important component was used more frequently than any other; coitus interruptus came next in frequency; the rubber cap next; and then quinine pessaries. The most striking contrast between the two American groups is in the fact that, whereas over 90 per cent. of the clinic group had previously used one or more contraceptive methods, only 30 per cent. of the poorer, less educated group had done so.

In the clinic group the most favoured previous method was coitus interruptus, and next in order of frequency were douching with a diversity of medicated solutions, the sheath, soluble pessaries, and sponges. The chief contraceptive devices of the maternity hospitals group were, in order of frequency, the sheath, douching with medicated solutions, coitus interruptus, and douching with plain water. Considering the economic level of this group, it is surprising that coitus interruptus (which costs nothing) did not come first in order of frequency, its prevalence—i.e., in 17·4 per cent. of the cases—being in fact lower than in any other English or American group that has formed the subject of a similar inquiry. Soluble pessaries were low and rubber pessaries even lower in the list, perhaps owing to the inflated retail prices of the former and the skill required for the correct application of the latter: but it is not improbable that women who adopted methods involving the use of these devices would be less likely than others of their social class to appear in the records of maternity hospitals. This latter explanation is certainly borne out by Dr. Hannah Stone's study of the contraceptive successes and failures of 2000 patients of the Maternal Health Centre, Newark, New Jersey, which tends to the conclusion that "if a woman scrupulously fulfils the instructions attaching to the use of the Dutch pessary combination, there will be about one chance in 100 of its failure in the course of a year, or approximately one chance in 5000 of its failing at each act of coitus." Similar results are recorded by the leading English clinics, wherein the proportion of failures is about 5 per cent.

One, at first sight, surprising fact brought out by Dr. Stone's statistical analysis is that douches of plain water have a higher record of successes than douches containing spermicidal substances. It seems probable that the effectiveness of post-coital douching as a contraceptive measure depends to some extent on a time-factor—varying inversely with the interval that is allowed to elapse between coitus and taking the douche. The greater success of plain water is thus explained by its being available at once, whereas the preparation of medicated solutions may result in the loss of valuable time.

PUBLIC SCHOOLS YEAR BOOK FOR 1934

THE forty-fifth issue of this year book—it was first issued in 1889, and became connected with the Headmasters' Conference in 1910—is something of a landmark, for it presents for the first time details of the leading preparatory schools; there is thus available under one cover official information regarding a large and important section of the national system of education. To avoid misunderstanding, however, the editors of the year book desire to make it clear that it does not purport to give information about all the public schools in the country but only those which are eligible for representation on the Headmasters' Conference. Besides this directory there is a large section dealing with careers in which parents, schoolmasters, and boys can find first-hand and trustworthy information about the navy, army, civil service, colonial services, and the various professions. Communications about the year book should be addressed to the Managing Editor, P.S.Y.B., 31, Museum-street, London, W.C. 1. The price is 10*s.* 6*d.*

BILHARZIAL APPENDICITIS

IT is now realised that in tropical medicine a great variety of affections of the vermiform appendix may be distinguished. There is undoubtedly a form of amœbic ulceration which may lead to perforation and this has been recognised in Egypt as well as in India and Malaya. Then again in malaria, and especially in the subtertian form, the appendix may be the seat of the pain due to blockage of the venules with sporulating parasites. The appendix, too, forms a resting-place for many intestinal worms; the roundworm may invade the lumen, as in the case recorded in our issue of Jan. 6th (p. 51) by Dr. H. E. S. Stiven, and the threadworm, oxyuris, is frequently found there also.

In bilharziasis the eggs of the parasite are very often deposited in the appendix and may give rise to a tumour of considerable size, exciting the symptoms of appendicitis, as has happened in many of the reported cases of infection with *Bilharzia japonica*. Interesting pathological specimens collected by the late A. R. Ferguson are to be seen in Cairo, and it appears that both species of bilharzia (*B. hæmatobia* and *B. mansoni*) can cause these tumours. Dr. Moh. Abdel Monem El Diwany (Jour. Egypt. Med. Assoc., March, 1934, p. 285) in describing the symptoms of this affection, shows that these do not differ much from the signs of chronic appendicitis. The tenderness over McBurney's point is not of much assistance except in the acute attack. Usually the appendix can be easily palpated and there is slight leucocytosis (10,000) with a definite increase of eosinophil cells. After operation treatment should be continued by means of intravenous injections of tartar emetic.

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[1] Obtainable from the Hon. Secretary, Birth Control Investigation Committee, 26, Eccleston-street, London, S.W.1. 2s.

A MIXED BAG

Sir William Hodgson is to be congratulated not only on his eightieth birthday but also on the birthday present which he has received from his fellow-practitioners in Cheshire. "Fasciculus Cestriensis" is a collection of short articles mainly therapeutic and largely, but not entirely, written by general practitioners. A rough-and-ready technique for tracheotomy, the use of turnip-juice in whooping-cough, the cleansing of a coated tongue with fresh pineapple, the improvisation of a catheter, the treatment of lupus vulgaris with permanganate of potash and of alopecia areata with methylated chloroform and oil of cade, are only a few of the practical points dealt with in this fascinating book.

The general practitioner's therapeutic armamentarium is culled from divers sources. If he is humble and sensible he will learn from all with whom his work brings him in contact, from the consultant on the one hand to the "wise woman" on the other. Doubtless some of his knowledge is mere superstition and much of it unscientific. Being so often unable to carry out control experiments, he is a frequent victim to the fallacy of post-hoc propter-hoc. Nevertheless, it sometimes happens, especially in cases of chronic disease, that neither the text-book nor the consultant can help him and, being thrown on his own resources, he remembers John Hunter's dictum, "Don't think—try." In the course of a professional lifetime he must discover something of value to medicine, especially to therapeutics, and the "Fasciculus Cestriensis" proves it. Sir William Hodgson has inspired the Cheshire panel committee, ably backed up by the Cheshire doctors, to make an attempt to pool their collective wisdom.

It is an example which might well be followed by other counties.

RADIOTHERAPY IN TUBERCULOUS MENINGITIS

Two years ago Prof. Z. von Bókay, of Debreczen, in Hungary, reported the treatment of 17 cases of tuberculous meningitis with deep X rays (see The Lancet, 1932, i., 894). The diagnosis had been made by finding tubercle bacilli in the cerebro-spinal fluid or in an inoculated guinea-pig, and five recoveries were claimed—in children between 3 and 12 years of age. As the condition is almost always fatal under ordinary circumstances these findings aroused much interest and several attempts have been made to repeat the observations. M. Faberi and C. Fumi, from the institute of clinical pædiatrics of the University of Rome, review (Policlin., April 23rd, 1934, p. 608) the results obtained and add particulars of nine cases treated by themselves according to Bókay's technique. In all they give particulars of 29 cases (including several in which there was evidence of miliary dissemination) in which the diagnosis had been established and deep X ray therapy was employed. It is unfortunately only too easy to summarise the results obtained, since in every case the patient died, and in several of them it was thought that the course of the disease had if anything been accelerated by the remedy.

CONTROL OF EPIDEMICS IN CHINA

The reports for the year 1932 of the National Quarantine Service of China are to hand in a volume of some 330 pages, with many illustrations. While much of the detail concerns port sanitary workers only, the account of the cholera epidemic of 1932 in which some 94,000 cases occurred with 31,000 deaths is of considerable general interest. Among the facts disclosed is that in Shanghai the death-rate among Chinese (4221 cases) was 7·06 per cent., and among foreigners (75 cases), 26·6 per cent.—a difference attributed by the authors to early hospitalisation of the Chinese. In neighbouring war-stricken towns where no hospital facilities were available a fatality-rate of 44 per cent. is recorded (212 cases). Chapters are also included on an epidemic of small-pox in Amoy; on a new survey of plague in wild rodents; on a rat-flea survey of Shanghai; and on the present status of the leprosy question in China. The year was a very difficult one since the work was disorganised in Shanghai and the quarantine station was destroyed in the Japanese attack on the city. The Plague Prevention Service in Manchuria was driven south of the Great Wall when the Japanese occupied that province. Nevertheless, much valuable work seems to have been accomplished and it is admirably reported. The records are edited by Dr. Wu Lien-Teh (Tuck), director of the Service, and Dr. Wu Chang-Yao.

NEW PREPARATIONS

Minadex.—From the Glaxo Laboratories (Osnaburgh-street, London, W.) we have received a syrup having the following formula for each fluid ounce:—

	Grains.		Grains.
Ferr. et am. cit. (vir.)	14	Sod. glycerophos...	1/10th
Calc. glycerophos. ..	2	Mang. glycerophos.	1/25th
Pot. glycerophos. ..	1/5th	Cupr. sulph. ..	1/25th

The *content of vitamins A and D for each fluid ounce* are claimed to be higher than that in the same quantity of medicinal cod-liver oil. The well-known therapeutic action of iron and the other salts and the vitamin content lead the proprietors to allude to the preparation as a threefold tonic. The tonic properties are obvious, while the suggested dosage ranges from half a teaspoonful for little children up to two teaspoonfuls, according to age, for adults, but the wise direction is printed on the bottle that Minadex is to be given only as a physician directs.

Sagradol.—The Angier Chemical Co., Ltd. (86, Clerkenwell-road, London, E.C.), have put on the market a new remedy for constipation, a combination of mineral oil and cascara sagrada, and they believe that the blend, which has been difficult to obtain in perfect balance, is a stable product. The peristaltic action of cascara synchronising with the moistening and softening results of the oil ingested, lead to an easy purgation and there should be considerable demand for the preparation. Clinical evidence concerning patients suffering severely from constipation indicates that a soft and normal stool may be produced in stubborn conditions of the bowel where harsher cathartics have been ineffective. For this reason the preparation has been used successfully in the constipation of pregnancy.

CHILD MARRIAGE

Few will be able to read unmoved the graphic account of the evils of child marriage given by Miss Rathbone in a little book recently issued.[1] Some may disagree with the attribution of blame, and some may see little hope in the proposed remedies; but that the social customs of India inflict unnecessary suffering upon little girls is hardly to be doubted.

Miss Rathbone explains and describes the Joshi Report on Child Marriage and discusses the Sarda Act, the disastrous delay in putting it into operation, and its non-observance at the present time. She examines the Census Report, with the population and vital statistics of the men and women of India, and then suggests remedies.

One hundred out of every thousand girl wives are likely to die in childbirth in first or later pregnancies; and out of every 100,000 children born alive, 45,000 die before the age of five. The expectation of life in India for men is 38·96 years, and for women only 36·75. Facts like these, culled from the Census Report, the Joshi Report, and from a dozen other medical and official sources tell their own depressing story.

The author's object is to arouse concern and responsibility among British readers, and the presentation is so vivid that she is not likely to fail to achieve this aim.

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[1] Child Marriage: the Indian Minotaur. By Eleanor F. Rathbone, M.P. for the Combined English Universities. London: George Allen and Unwin. Pp. 138. 2s. 6d.

ADDRESSES AND ORIGINAL ARTICLES

EXPERIMENTS ON MAN [*]

By J. Barcroft, C.B.E., M.A., F.R.S.
PROFESSOR OF PHYSIOLOGY, CAMBRIDGE UNIVERSITY

When I was honoured with an invitation to give the Stephen Paget memorial lecture, that invitation was coupled with a request that I should take as a subject "Experiments on Man," but, perhaps unfortunately, it was left to me to interpret that phrase. Two possible interpretations I have put on one side, the first is sociological; it would be possible under the title of experiments on man to treat of one of the most interesting and important types of experiment, that which subjects groups of persons to certain altered sociological conditions. Having regard, however, to the memory of Stephen Paget and to the particular cause to which he devoted his life, I conceive that in the present connexion some more individual type of experiment was in the minds of those who asked me to lecture. On the other hand, I could treat of experiments, such as the classical one of Fick and Wislicenus, which while extremely informing were quite unattended by any particular risk to the subjects, and indeed may have formed an entirely pleasurable excursion. I have in the main set such aside also, and for the same reason—namely, that Stephen Paget's devoted labours had to do with experiments which, though not necessarily painful, were conducted under an Act of Parliament designed to secure the conscience of the nation against the suggestion that it tolerates wanton cruelty within its borders. The researches of which I shall treat to-day are on men, but are such that they would have to be conducted under the Act 39 & 40 Vict. of 1876 were man regarded as being a "vertebrate" in the sense of that Act. And in particular I wish to treat of a certain aspect of this subject—namely, the answer to the following very legitimate and indeed necessary question, "Can the results of experiments carried out on animals be regarded as applicable to man?" Let me say that I am not concerned here with the ethical aspect of my subject.

Can the results of experiments performed on animals be regarded as applicable to man? If we are to adhere to precise language, we are under no suspicion of "beating about the bush" if we refuse to answer our question either with a direct "yes" or "no"—many most important questions are insusceptible of monosyllabic answers. The results of such experiments as can be performed on animals can, as a rule, be transferred to man, though not without reservations, and these vary with the nature of the experiments. It is our object to discuss these reservations.

I wish to preface my remarks by a word or two about the meaning of the word "certain." Little in this life is "certain" in the absolute sense. Your secretary asks me in March whether I will lecture to you on June 5th. I say, "I shall feel honoured." He says, "Are you 'certain' that day will suit?" I look in my book and I say "yes." He at a later date issues a notice stating that: "The Eighth Stephen Paget memorial lecture will be delivered by Prof. J. Barcroft on June 5th, 1934, in the School of Hygiene and Tropical Medicine. The chair will be taken by the President, the Rt. Hon. Lord Lamington," &c. Now none of these things are "certain" in the absolute sense. I may die; the chairman may be sent abroad on urgent public business. An earthquake may wreck the building; nevertheless the secretary is not guilty of inaccuracy; to qualify his statement would be but pedantry. We understand by "certain," in this connexion, something which is so certain that we may reasonably take action upon it. This question, like most other questions, is largely one of probabilities, and as such even a single experiment on an animal has a value. You take a draught by mistake from some bottle the contents of which had, so far as you knew, never previously passed human lips; your apprehension would be great in any case, but it would be much greater if you knew that a comparable dose of the contents of that bottle had killed a rabbit than if you knew that the material had been administered to the animal without any perceptible effect. The event might not justify you, nevertheless that confidence so far as it goes would be wholly reasonable. In expecting that the drug would not kill you because it did not kill the rabbit you would be using an uncertain weapon, but even so you would run no mean chance of hitting the target. The small amount of experimental knowledge yielded by a single experiment on an animal would have a value. To attain a higher degree of certainty the problem becomes one of narrowing the issue, of bringing the target ever nearer to the marksman until in the end the chance of a direct hit amounts as nearly as possible to a certainty. How far can this be done?

Objective Experiments

I will first take the case of relatively simple substances, for it was in the use of such that I, personally, found myself face to face with this problem in a form which admitted of no evasion. That approach had to do with the administration of simple chemical substances which in one way or other act on the relatively uncomplicated processes of living protoplasm. The most obvious way of narrowing the issue is to broaden the basis of experiment. You can learn something as I have said by experimenting on a single form of life, but the more various the species on which you experiment the less uncertain will be the extrapolation from animals to man. That would follow a mere consideration of the probabilities of the situation. But you can narrow the issue still further. If you find differences between different forms of life, and if you can ascertain the causes of these differences, and if you can place man, relatively to these causes, you have narrowed the issue considerably. For instance, in the category of simple chemical substances may be put such a protoplasmic poison as hydrocyanic acid. The mode of action of this drug, largely through the researches of Evans, of Keilin, and of Warburg, is now known; it prevents the oxidation processes of the body by destroying the action of the enzymes concerned; in the case of the higher vertebrates the essential failure is that of the activity of the respiratory centre. There is no reason to suppose that these essential processes of life in man differ materially from those of other mammals, and therefore it might be supposed that weight for weight the lethal dose of prussic acid would be of the same order throughout the warm-blooded animals. Fig. 1 shows a number of curves. They refer to the strength of prussic acid vapour in the air (ordinate) which proves fatal to various mammals in the times given in the abscissa.

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[*] The eighth Stephen Paget memorial lecture, delivered on Tuesday, May 5th, 1934, at the annual general meeting of the Research Defence Society.

Similar curves have been drawn out for other mammalian species, great and small; they all fall within the limits of the area A B C D E F G. With so much information therefore it would seem extremely likely that somewhere within the area, or not far outside, the curve for man would fall. To take an example, if we are driven by circumstances to take action, and wish to know how long a man can survive a concentration of 0·6 milligramme hydrocyanic acid gas per litre, the answer is that he would be exceedingly unlikely to die if exposed for less than one minute and extremely unlikely to live if exposed for much more than 15 minutes. This answer we know to be correct so far as the inferior limit is concerned, for the matter was on one occasion put to the test by an experiment on man. The subject was in the gas for upwards of two minutes, at the end of which time he was still in possession of his faculties.

The limits of course are wide, and if we knew the reason why the dog and the mouse are so susceptible, while the monkey and the guinea-pig are so resistant—the monkey at one end of the scale and the guinea-pig at the other—we could probably place the toxicity of the gas for man within much more precise limits. Concerning the great susceptibility of the mouse there is nothing surprising. It would seem to follow a general law familiar to all physiologists, the mouse being very small passes a great deal of air through its lungs in a given time for the size of its little body. It therefore per gramme of mouse inhales a great deal of the gas. Now the mouse can only live if it destroys the prussic acid as fast as the gas is inhaled. There is no special reason to suppose that the power of a gramme of mouse to destroy prussic acid is greater than that of a gramme of a larger animal, the mouse therefore is killed in low concentrations of the gas.

The dog forms a more interesting study, it is more akin to man in size and quite of the same order as the monkey or the goat. Why is the dog so susceptible? The first point to emphasise is the special way in which the drug is administered—namely, by inhalation. The lethal dose is much the same for most mammals, including those mentioned when injected into the blood, but a given concentration when breathed produces widely different results, it is natural to ask this question. When the drug is injected intravenously he is not particularly susceptible. The question therefore arises—do the dog and the goat really inhale the same quantity of air weight for weight? We may reasonably suspect that they do not. When the animal is exposed to hydrocyanic acid the initial effect of that gas on the respiratory centre is one of stimulation. The dog is capable of a much greater and more sustained degree of activity than most other animals. He can run down almost anything and pre-eminently he can run down man, from which it may be inferred that the maximal total ventilation of which the dog is capable is for its size greater than in man. The reason why dog yields so quickly to an atmosphere of prussic acid is probably due to the power of his respiration; he takes a much larger quantity of the fatal gas; in short, he takes a bigger dose. Knowing these things the issue is much narrowed, and it might confidently be predicted not only that man would fall inside the limits which I have indicated, but that the gas would be much less powerful in its effect on man than on the dog, and that, again, is so because on the occasion of which I told you there was a dog in the lethal chamber with the man; at the termination of the experiment the dog was moribund.

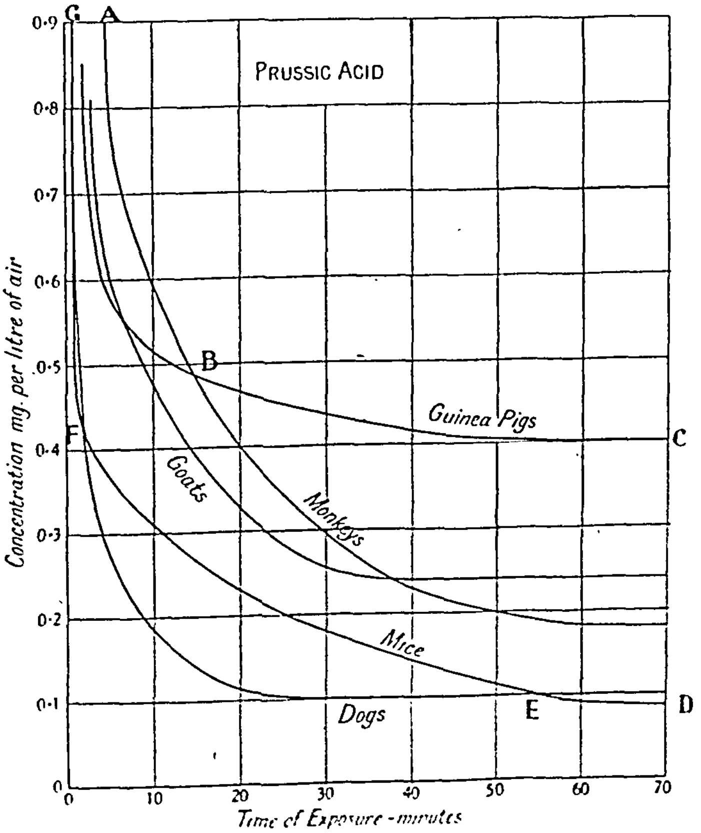

FIG. 1.—Concentration curves showing time of exposure to HCN, which produce 50 per cent. deaths.

I need not emphasise the practical importance of the problems. Prussic acid itself has come into use on a large scale for the decontamination of ships, and questions are constantly arising whether exposure to the gas can have been the cause of subsequent disability. Not only so but in the ever-increasing complication of industrial processes new dangers arise from the exposure of employees to unsuspected gases in the atmosphere, and in case of some unexplained death or illness questions arise at once—What fumes were in the air to which the victim had been exposed? Were they toxic? Can he have been exposed to them in sufficient concentration to account for his illness?

But not all gases met with in commerce offer so simple a problem as prussic acid—e.g., gases which irritate the lungs such as chlorine or phosgene offer a more complicated type of problem. They are both met with in commerce and about both the question arises, what concentrations can man tolerate? Is it possible without doing experiments on man to obtain information on the toxicity of irritant gases, and if so how reliable is that information?

Fig. 2 shows the concentrations of gas which ultimately prove fatal if the animals are exposed for the times stated. Here again, unless the man has some special property which animals have not, he is likely to fall within the general area occupied by the curves. The area is a very wide one.

Can we by considering the physiology of the animals narrow it? The apparent resistance of the rabbit and the goat can be explained; they have remarkable powers of holding their breath—faced with an irritant gas they can and do refuse to breathe it. As man has not this power the rabbit and the goat may be wiped off the picture. The remaining animals, and there are many more than those shown, form mostly a compact area. They are so diverse and the area so compact that the compactness can scarcely be due to chance and therefore unless man has some peculiarity he may be supposed to fall in this compact area. There is, however, one peculiarity of man which may affect the situation; irritant gases produce coughing in man. There are many quite harmless ways of producing a fit of coughing in which case the effect of coughing on the total ventilation may be measured.

Can we without doing an experiment on man give any information about the concentration of chlorine or phosgene in the air of a works which we would confidently describe as not being injurious to man? Such a question might arise in case an employee developed some lung trouble after exposure to an atmosphere which caused suspicion. Clearly we can answer it with a high degree of probability. The curves in Fig. 2 apply to deaths, but a similar series might be made out in which the time of exposure was plotted against the just perceptible lesion. There is no reason to suppose that a greater or less concentration of chlorine or phosgene would be required to produce a lesion in man than in animals generally and so, allowing a margin of safety, it would be possible to say, unless a man were exposed to such and such a concentration for such and such a time, he would be unlikely to be injured. This, of course, is not intended to weaken the practice of so designing plant as to have the air quite pure.

Experiments on Sensation

It seems clear that for experiments of simple type, the results of which are purely objective, a great deal of information may be obtained upon animals which can be transferred with considerable confidence to man. How far can experiments on animals yield correct information with regard to human sensation? The difficulties here are much greater and for two reasons. The first is that the various sensations are developed in very different degrees throughout the mammals including man; the second is the obvious difficulty of getting the animal to tell you what he feels. I take these difficulties one by one.

1. Concerning the unequal development of sensation, it is a commonplace that some sensations are ill-developed in man whilst others are highly developed. The sense of smell for instance is obviously very poorly developed in man as compared with very many animals. Yet, keeping still to the study of the respiratory passages, things in the air which are intensely irritating to man appear to have no effect or scarcely any effect upon animals. In such cases, of course, it is not possible to decide how much of such a substance must be in the air in order to produce irritation of a given degree of gravity. The recognised procedure is simple; the test must be made upon a human subject, but the subject is exposed first to a concentration of the gas in the air so dilute that he cannot feel it and gradually and in successive tests the concentration is increased until the required information is obtained. Of those who have exposed themselves to such tests I should doubt if there is now alive in this country anyone who has done so more freely than Prof. Raper of Manchester, who, during the war and in collaboration with the late Colonel Harrison and Major Ball, was responsible for that marvel of efficiency, the British Army respirator. I mention the matter, simple as it is, for the sake of establishing the general principle, which can be applied to more delicate and more complex problems—viz., that of working up from something which is harmless, to solve a problem about something which is the reverse.

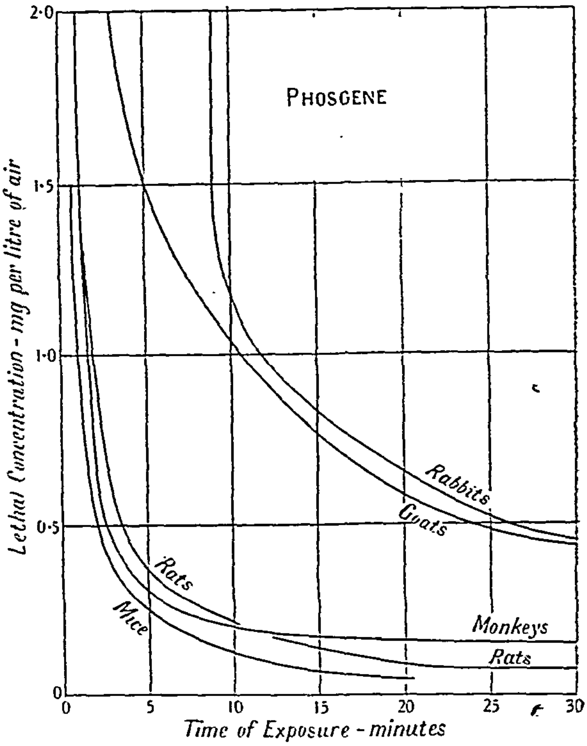

FIG. 2.—Concentration curves showing time of exposure to phosgene, which produce 50 per cent. of deaths within three days.

2. I said that there were obvious difficulties in getting an animal to tell you what he feels; note that I say *what* he feels not *whether* he feels. If an animal is in pain I am sure that a person versed in his language would know it. I doubt, for instance, the possibility of an animal in the Zoological Gardens experiencing real suffering without the fact being obvious to one of the trained attendants in that institution. To define exactly what is being felt is, however, a matter so difficult that even the most experienced experts do not always find it easy. The instance of such an experiment which first comes to my mind is the classical one in which Head and Rivers explored the sensations contingent on the cutting, and regeneration, of the nerve going to an area of skin on the forearm. It may be doubted whether a greater superstructure of theory was ever built upon a single experiment. The phenomena of sensation as they appeared to and were described by Head, the partner whose nerve was cut, shaped themselves into the theory of crude and delicate sensibility, as being quite distinct forms of sensation, a theory so intriguing that it soon became expanded, especially by Rivers; so that before his death it embraced not merely the phenomena of regenerating nerve and mental aberration, but a whole system of philosophy. Yet the tragedy of all this is that no

subsequent observer has found it possible in portraying his sensations to reproduce Head and Rivers' picture of epicritic and protopathic sensation. Three very serious researches have been carried out on this subject from different angles. The surgeons have done it in the persons of Trotter and Davies, the psychologist in the person of Boring, and the physiologist in that of Sharpey-Schafer. There is unanimity as between these observers on two points: first, that a single experiment of this type would not suffice even to teach them correctly to describe their sensations; secondly, that the description in no case supports the theory that crude and delicate sensations differ not only in degree but in kind. Not that Head and Rivers did not make a great advance. Of all who appreciate the step forward which they made I imagine those who appreciate it most are those whom it inspired to tread this same path. The theory of protopathic (crude) as different from epicritic (delicate) sensation awaits confirmation; meanwhile there remains the heroism and example of its founders, and if they did not reach finality it may at least be said of them in a preeminent degree "they have laboured and others have entered into their labour."

Experiments on the Higher Faculties

When the issue is that of testing the effect of this or that procedure on the higher faculties, it goes without saying that the subject tested must be man himself. You cannot test the minimum atmospheric pressure at which differential equations can be solved on mice. As an example of the sort of experiment I have in mind I recall one in which the problem was set by authorities who were interested in certain special problems of ventilation. I was asked how many persons could in an extreme case work in an unventilated room of a certain size. The first issue was this, if a certain number of people are in a closed room what is the essential factor which will reduce the quality of their work? In a small way it is the same problem as that of what killed the people in the Black Hole of Calcutta. History has always assumed that they died of asphyxia. Modern views of ventilation all point in a different direction—namely, that they died of heat stroke. If there is no through current and the amount of heat produced by persons in a room is greater than the walls of the room can carry away, the temperature of the inhabitants must rise, and in the extreme case fatally.

In the experiment in question a well-built basement room was chosen—the weather was hot and sultry with no movement in the air. Eighteen persons, of whom 13 did expert typewriting, spent from 8 A.M. till 4 P.M. in the room. All the chinks round the windows were made tight with paste and paper, the door and chimney were closed up, and there was as nearly as possible no ventilation. Fans were going and everything was blowing about. The circulating air evaporated the perspiration from our skins, which in turn condensed on the walls. For my part I made analyses of the room air from time to time while others carried out their prescribed tasks, mostly typewriting. All went well. On the next occasion with the same room, the same people, and approximately the same weather, the procedure was changed. The fans were abolished, but all unknown to the subjects I removed some of the window panes, so that although there was no perceptible movement in the air of the chamber, it was perfectly pure from the chemical point of view. The remarkable fact emerged that not only were the subjects more comfortable on the first day, but they did their work better, made fewer typographical errors, and so forth. It goes without saying that such experiments cannot be carried out on animals. We are in fact getting near limits which define the area in which experiments can be carried out at all. Somewhere near that limit is the whole territory of psychological tests—a subject on which I do not feel myself qualified to speak. I will only say this: that more than a dozen years ago I assayed to discover whether the mental abilities of a party of researchers who came with me to Peru were of their usually high standard when living at an altitude of 14,000–15,000 feet in the Andes; for this purpose I gave them what seemed to be suitable mental tests; the results when tabulated showed little or no falling off as compared with those yielded by the same persons doing the same tests at sea level. Yet the results of the tests were in a sense quite illusory, and obviously so—the work was as well done in the Andes as on the sea, but the effort of doing it and the concentration required were enormously greater. I expressed my disappointment at my failure to show up the mental deteriorations of my party, to Dr. Miles than whom I suppose there was no higher authority at that time on the value of mental tests, and I attributed my failure to my own inexperience. He very kindly said, "Barcroft, you are only where we all are." Since then much water has run underneath the bridge and psychological technique has made great strides, but speaking on this subject quite as a layman I suppose the difficulty of expressing in units which can be tabulated the amount which a given performance "takes out of the performer" is still a very real one.

Referring once more to Cerro de Pasco, I was told on high authority that an official of the Cerro de Pasco Copper Corporation would write a difficult report as cleverly at Cerro as in New York; but in New York he would do it in his stride, at Cerro it meant a subsequent trip down to the coast.

Disease

Disease in its simplest form—or at all events its simplest form from our point of view—may be no more than an upset of the balance of normal conditions in the body. A case in point would be the effects of hæmorrhage. The scheme of the hydrostatic arrangements in the human body is of the same character as in the higher animals; indeed, on broad lines there is singularly little difference throughout the mammals. The effects of deprivation of the blood can therefore be studied quite well on animals, and all the relevant information can be obtained. True it was an experiment on man which gave me a very broad hint that the volume of circulating blood could be adjusted within limits by contraction of the spleen. But the proof came entirely from animals, and more especially the very striking demonstration that quite a large volume of blood may be lost without prejudice to the actual amount of fluid in circulation. The amount being made good from the spleen and other depots. We may go further, and say that not only the effects of diminished blood volume can be ascertained by animal experiment but a great deal of information about the possible causes. The production of histamine in wounded tissue, its effects upon the permeability of the vessel walls, and so forth, all these have been discovered and demonstrated on animals. Man has no monopoly of histamine, nor does it act differently on human and feline tissues. It therefore happened that armed with a working knowledge of the effects of this material upon animals, Dale and Richards were at once able to recognise these same effects when they saw them in cases of wound shock. And if the last word has not been said on this subject, as Blalock would have us believe, it is not because man differs from other mammals in his reactions to loss of fluid from the vascular system.

But there are other and more complicated problems connected with the causation of disease. Let us turn to one or two presented by communicable disease. In general there are two problems: (1) what is the organism, or virus, which is the essential cause of the disease; and (2) what is the intermediate host, if any, by which it is communicated? If the disease is one to which a great many forms of life are susceptible the ground may be cleared by experiments upon them—such a case is plague. The typical symptoms of this devastating complaint are shown by mice, rats, and guinea-pigs. Rabbits[1] when inoculated, while rats, mice, monkeys when fed on cultures of plague bacilli acquire the disease and generally die with characteristic symptoms and lesions. Among these animals the rat is pre-eminent. Experiments with these have shown how the epidemic is transferred from rat to rat—namely, by the appropriate flea. Moreover, infected fleas when they bite other animals communicate disease. It is no wild exterpolation therefore to assume that the rat flea, if he is infected and bites a human being, will give the disease to him. If the human experiment had never been performed, there would have been a sufficient degree of certainty to warrant the declaration of a war against rats and their fleas, as the most promising campaign for the purpose of eliminating of plague among human beings.

Trench Fever.—But the disease may, unlike plague, be one which is not known to reproduce its symptoms in any form of animal life. Then the human experiment is imperative. The history of trench fever, which I quote from Major Byam,[2] is a case in point.

> "The question was, How did the germ leave the sick man and enter the healthy? Our recent work carried out for the War Office Trench Fever Research Committee has done a good deal to clear this mystery up. Several very gallant men came forward to help us in our task, and it is not too much to say that without such help we would have found out nothing, since experimental animals, which are all apparently resistant to trench fever infection, could not be used. These men volunteered to let us try to give them trench fever in any way we thought the disease might spread naturally in the field. The first two men to come forward were W. H. Cole and H. H. Edgeler, and to them great credit is due, as the work for which they offered themselves might, for all they knew, be productive of the most unpleasant consequences. Attempts were made to convey trench fever to these two men by allowing lice taken from the trench fever patients to feed on them. Nothing happened though the experiments were continued many weeks, but as we anxiously watched the men from day to day we were struck with the fact that they never scratched their skin where the lice had bitten. Was scratching an essential to infection? To test this possibility the skin of a new volunteer named D. Sullivan was on Feb. 5th, 1918, scratched by means of a needle, and the droppings of the lice feeding on Cole and Edgeler rubbed into it. A week later Sullivan developed trench fever, and as a result the usual method of transmitting the disease had been demonstrated, for we have repeated this and similar experiments many times with unfailing success. We have ourselves kept the droppings of lice for four months and then produced trench fever by introducing them into the skin of a healthy man which shows how truly infectious they are."

Yellow Fever.—Trench fever is not likely to kill the subject. But how does the case stand if, like yellow fever, the disease is one which apparently is almost certainly fatal? It has been claimed that 94 per cent. of the cases of yellow fever in the great epidemic in Rio in 1898 died. So we pass to yellow fever. When the subject became ripe for experimental work there was believed to be no experimental animal which could be used, for the simple reason that no animal was known to be capable of taking yellow fever. It was possible, however, to take advantage of the principle of working up from the harmless to the harmful, because there are numerous strains of yellow fever. If I may quote from the account given by Prof. Boyce of the work of the American Commission:

> "Finlay found that in 18 per cent. of his inoculation experiments there resulted a very benign form of yellow fever." Of these Case V. was one.
>
> "Case VI.—C. W., American, non-immune, aged 27, with his full consent was at 9.30 A.M., Jan. 31st, bitten by two of the three mosquitos that had been applied to . . . Case V. The interval that elapsed since their contamination was therefore 51 days." The subject obviously showed characteristic symptoms of yellow fever in three or four days. Convalescence was rapid.

Roughly then let me sum up: purely objective experiments do not as a rule demand the use of man; in a great many cases the relevant information can be obtained on animals. Experiments on sensation and on mental performance must usually be carried out on man himself. As regards the communication of disease, if animals show symptoms of the malady they can be used at all events to clear the ground. If they do not, resort must be had to the human experiment.

Conclusion

The considerations with which I opened this discussion brought back to me some recollections of the Great War. But a greater war is constantly being waged. It becomes dramatic when nations clash or when capitals are wiped out as was Rio by yellow fever. The dramatic element is due to the concentration of the fatalities in a small area, but disease is waging war to-day against mankind; less dramatically because its victims are diffuse in space, but no less certainly.

The proof that plague could be communicated to men was according to the text-book statement first supplied by Whyte, who injected himself with blood taken from a plague patient. I leave it to the judgment and conscience of my hearers to decide whether if to-day the matter could be settled with a high degree of certainty on rats, marmots, monkeys, and the like, such an act in any case one heroism would not verge on unjustifiable suicide?

The second instance quoted was injection of the disease into a condemned criminal. Having regard to the great number of experiments which usually are essential to the proof of anything, having regard to the paucity of condemned criminals, and having regard to the obvious abuses to which such a course is open, I again leave it to your judgment whether, if the relevant information can be acquired from animal experimentation, we should have recourse to the use of criminals. Personally I am against the use of criminals.

The third instance quoted was a deplorable accident in Vienna in which workers in some unaccountable way became infected from the germs of a culture.

A Pledge

I do not leave it to your judgment whether in the face of death around us we are to fold our hands and wait for accident to enlighten us. We of the

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[1] Manson's Tropical Diseases, London, 1931, p. 256.

[2] Quoted from "Lice and their Menace to War," London, 1929. Chapter XI. written by Major Byam, R.A.M.C., p. 126.

Research Defence Society are pledged to the combat; we believe we have open minds; we believe that research is a most potent weapon, therefore we are pledged to research; we are pledged to certain methods of research—namely, animal experimentation—because we think that many problems can be solved most rapidly and most humanely by that method; but we welcome no less any other method which will be of use, any other weapon with which the war may be waged. We welcome criticism, but we judge it according to its constructive value. With the policy of waiting for the illuminating accident, with the policy of folding of the hands, with the policy of wrapping the talent in a napkin, we have nothing to do, but all legitimate methods, all useful criticism we welcome "so that by all means we may save some."

THE RÔLE OF THE LIVER IN THE METABOLISM OF CARBOHYDRATE AND FAT *

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II.—THE LIVER AND CARBOHYDRATE METABOLISM

It was Claude Bernard who first appreciated the significant fact that the liver may provide sugar for the body. He regarded liver glycogen not only as a store of carbohydrate, but also considered the possibility that the liver might secrete this material in much the same way as we now believe other organs do their internal secretions. Because of the relative ease with which changes in liver glycogen may be studied, a great deal of attention has been given to this substance and perhaps not enough to the conditions which govern the rate of discharge of sugar from the liver. There is no room for doubt that the amount of glycogen and the output of sugar may sometimes be closely related, but these factors are not as interdependent as is often assumed. To a reviewer who entertains the idea that evidence will be forthcoming that sugar is made from fatty acids in the liver under certain circumstances, the discussion of gluconeogenesis at the present time is particularly unsatisfactory. Furthermore, nitrogen excretion as an index of sugar formation from protein leaves much to be desired. The difference between the sugar content of the blood of the hepatic vein and that of the hepatic artery and portal vein, which is not accounted for by change in liver glycogen, dextrose, or lactic acid, is the only reliable index of the rate of gluconeogenesis taking place in this organ.

Insulin and Gluconeogenesis

The evidence that there is an excessive sugar production by the liver after the removal of the pancreas is quite satisfactory, and since insulin completely corrects this abnormal condition there are good grounds for the belief that it inhibits gluconeogenesis in the diabetic. The end-results of insulin in the diabetic organism could be adequately explained on the hypothesis that insulin restored the ability of tissues to utilise dextrose, but, as I mentioned in the previous lecture, this property does not disappear after pancreatectomy.

Laufberger suggested inhibition of gluconeogenesis as a complete explanation of the action of insulin in the normal animal. The well-established effect on muscle glycogen proves that this is not the case. The probability that inhibition of gluconeogenesis plays a part in the action of an excess of insulin was stressed by Lesser and his colleagues and by Best, Dale, Hoet, and Marks.[1] As Cori [2] has pointed out, there are several series of experiments the results of which can best be interpreted on this ground (Issekutz; Macleod, Noble and O'Brien; Sahyun and Luck; Cori, Cori, and Buchwald). The finding that in unanæsthetised animals the hepatic vein blood contains less sugar when an excess of insulin is provided, and the less satisfactory evidence that this fall precedes the decrease in systemic blood-sugar, is very significant. This work has been conducted on adult rabbits and dogs in which an excess of insulin produces a fall of liver glycogen and free sugar. The lactate content may be approximately constant (Cori, Cori, and Goltz; Kotschneff [3]; Molitor and Pollak). These points are so important that repeated confirmation with certain extensions and possibly improvements in the experimental technique is desirable, but we may regard the evidence, at present available, for inhibition of gluconeogenesis in the normal animal by an excess of insulin as reasonably satisfactory.

Liver Glycogen

Our attention is much more frequently focused on glycogen. A convenient way of discussing liver glycogen in brief space may be to consider the formation and breakdown of this substance in diabetic and in normal animals.

LIVER GLYCOGEN IN DIABETIC ANIMALS WITHOUT INSULIN

Minkowski could detect no glycogen formation in the liver of a depancreatised dog when dextrose was provided, but reported positive results with fructose. Cruikshank in 1912 did not confirm this finding with fructose, but the livers he used were obtained from animals from which heart-lung preparations had been made. Paulesco found just under 3 per cent. of glycogen in the liver of a depancreatised dog after the oral administration of sucrose or glucose plus fructose. Banting, Best, Collip, Macleod, and Noble found 1·3 per cent. in the liver of one dog to which very large amounts of sucrose had been given. Bollman and Mann [4] have recently reported a transient retention of ingested fructose in diabetic dogs. This may be due to glycogen formation, which Cori has shown to be particularly rapid in the normal animal when this sugar is provided. There is no convincing evidence that the diabetic is able to burn fructose better than dextrose. Bodo, Tui, and Farber, and Major and Mann, have demonstrated a definite accumulation of glycogen in depancreatised dogs after the intravenous administration of dextrose. The previous work was open to several objections, which are successfully met in the recently reported studies. Major and Mann used dogs which had been treated with insulin immediately after the removal of the pancreas. Insulin injections were discontinued for a period of five days before the experiment. On the fifth day glucose was infused for from 10 to 12 hours. In a convincing number of the animals used, the deposition of glycogen was approximately 1 per cent. greater than that of control dogs. It is thus established that the depancreatised animal is able to store glycogen in the liver in the apparent absence

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* Three lectures delivered for the University of London at University College on Jan. 11th, 15th, and 18th. Lecture III. will appear in a forthcoming issue.

of insulin, and under these circumstances we must look upon this process as proceeding at a slow rate (possibly by reversal of the action of glycogenase). The blood-sugar must have been very high in these experiments. There is no evidence that even a trace of insulin is present under these conditions, but the possibility that cells cling tenaciously to the last few molecules cannot be completely ignored. In the presence of insulin the rate of glycogen formation is, of course, greatly accelerated in both liver and muscle. Under the usual conditions in depancreatised dogs not receiving insulin, liver glycogen is at a very low level. In the decapitated cat some 20 hours after removal of the pancreas no recovery of liver glycogen is demonstrable. When the pancreas is present this process proceeds with considerable speed (Evans, Murphy, and Young).[5]

LIVER GLYCOGEN IN DEPANCREATISED DOGS WITH INSULIN

In 1923 Banting, Best, Collip, Macleod, and Noble found a very large deposition of glycogen in fed depancreatised dogs which received insulin. These results, which have been amply confirmed, established only that the accumulation of glycogen was an end-result which was observed some 48 hours after the insulin administration had been commenced. Quite recently Bodo and Neuwirth have shown that the increase of liver glycogen following the administration of glucose and insulin begins practically immediately, and the accumulation is apparently continuous. Hédon and Cori independently demonstrated a rise in liver glycogen in the fasting depancreatised dog after the administration of insulin. Cori found similar results in cats.

BREAKDOWN IN LIVER GLYCOGEN IN DEPANCREATISED ANIMALS

The rapid decrease in liver glycogen after removal of the pancreas requires no new comment. Adrenaline accelerates this process. The breakdown of hepatic glycogen in depancreatised animals receiving a constant amount of insulin has not been extensively studied. It is probable that the process proceeds very much as in the normal animal. There is an opportunity for further work in this field, however, because it would be interesting to determine to what extent, if any, the action of adrenaline on the liver glycogen of normal animals is due to changes in the rate and amount of insulin liberated from the pancreas. Small laboratory animals in which complete pancreatectomy can be readily performed are not easily available, but C. N. H. Long informs me that kittens have provided useful preparations.

The inter-relationship of the adrenal medulla and the pancreas is so well established that it may now be regarded as the duty of the experimenter who uses insulin to study, at the very least, suprarenalectomised animals before attributing the effect produced to a direct action of the antidiabetic substance and to study depancreatised animals as a part of an investigation of adrenaline action on carbohydrate metabolism. When we follow this idea to a logical conclusion the necessity of eliminating other glands of internal secretion and the need for studies of perfused organs under physiological conditions becomes increasingly apparent.

LIVER GLYCOGEN IN NORMAL ANIMALS

In normal animals very convincing evidence has been obtained by Cori and others that many different sugars give rise to glycogen in the liver—glucose, fructose, galactose, mannose, and arabinose. Xylose and the methyl pentose rhamnose do not increase liver glycogen when fed in a manner similar to the other sugars. Some of the amino-acids may provide a source of liver glycogen, but results obtained on diabetics cannot be transferred without modification to normal animals (Hodgson).[6] Glycerol is effective. One of the most interesting of the three carbon compounds is, of course, lactic acid. The dextrorotary lactic acid particularly has been found to form glycogen with great rapidity. Lactic acid formed in muscular exercise (Himwich; Long and Grant) may result in an increased liver glycogen. This aspect of the subject has been frequently reviewed. Drury and Salter [7] have recently shown that many derivatives of glucose which form glucose or glycogen readily in the intact animal fail to benefit the dehepatised rabbit. These results and those previously obtained by Mann and Magath emphasise the importance of the liver in the conversion of even very simple glucose derivatives into a form in which they are utilisable.

Since we may believe that none of these substances mentioned deposit liver glycogen in more than small quantities in depancreatised animals without insulin, *we must attribute this formation in normal animals in large part to the effect of insulin.*

Yet in 1923 McCormick and Macleod, using rabbits, and Dudley and Marrian, using mice, found a definite decrease in liver glycogen in fed or fasted animals when insulin was administered. In 1929 Cori and Cori found that when the blood-sugar levels in two groups of rats was maintained approximately the same by supplying more sugar to those who received insulin, deposition of the liver glycogen was of the same order in each group. Bodo and Neuwirth, working on normal dogs under morphine-chloralose anæsthesia, found that the glycogen storage in the liver which occurred with sugar alone was decreased when small amounts of insulin were given. Larger amounts of insulin produced a decrease in liver glycogen. This breakdown in liver glycogen was not due to hypoglycæmia, which has been shown in a convincing manner to be accompanied by liberation of adrenaline (Cannon; Houssay).

Before we assign to insulin two antagonistic rôles in the normal animal with regard to liver glycogen, let us examine other experimental results.

The experiments to which we have referred suggest that insulin and glucose given to a normal animal never result in a greater deposition of liver glycogen than would be produced by the sugar alone, that is, that the sugar liberates an optimal amount of insulin from the animal's own pancreas. There are, however, exceptions to these results. Deposition of liver glycogen was reported from Lesser's laboratory to be somewhat increased in the livers of mice when insulin as well as sugar was provided. Collazo, Händel, and Rubino fasted normal guinea-pigs for 18 hours and then administered glucose by stomach-tube. The animals which received insulin *after* the sugar had a greater content of liver glycogen than those which received the sugar alone. In 1929 Goldblatt [8] was able to show that exogenous insulin resulted in an increase of liver glycogen in the fasting young rabbit. This result has been confirmed by Sahyun and Luck, Corkill, and Bischoff and Long, and is the most notable and consistently recorded instance of increase in liver glycogen in the normal animal after insulin administration.

In view of the fact that the usual effect of an excess of insulin in most species is a decrease in liver glycogen, the question arises whether or not this action of insulin in young rabbits is a direct one. All of these workers, including Goldblatt, have shown that adrenaline injections may cause an increase in liver glycogen in these young animals, and it may be asked whether or not the insulin effect is due to a participation of the adrenal or one of the other glands, the secretion from which affects carbohydrate metabolism.

When the pituitary gland has been removed from these young rabbits insulin fails to produce deposition of liver glycogen (Corkill, Marks and White),[9] and I believe that preliminary experiments from the same laboratory conducted by Corkill and Cope indicate that the effect is not seen in suprarenalectomised young rabbits. Adrenaline seems a much more likely intermediary in this action of insulin than a pituitary hormone. In any case it appears unlikely that it will be necessary to consider this effect on young rabbits as a direct action of insulin.

The possibility must also be considered that the depletion of liver glycogen after injection of insulin observed in most species which have been studied is attributable to liberation of adrenaline which, as we will see later, may cause either an increase or a decrease in liver glycogen. There are difficulties in the way of accepting this conclusion. In 1927, Cori and Cori, and in the same year Artundo, found a decrease in liver glycogen in adrenalectomised rats which had received insulin. We cannot, therefore, under certain circumstances, hold the adrenal responsible for the decrease in liver glycogen so commonly observed after insulin. (It must not be forgotten, however, that the adrenal medulla may normally participate in this process.) This action of insulin may, however, be exerted only in part directly on the liver. We should not lose sight of the fact that under physiological conditions the action of insulin seems to be the storage of glycogen in the liver, and I still find it difficult to believe that experiments in which the amount of insulin present is increased only very slightly over that available from the pancreas will not reveal an increase in liver glycogen in species other than young rabbits or kittens. This plan has as yet yielded no success using rats, but samples should perhaps be taken earlier. The presence of large amounts of glycogen in the normal liver is, after all, due in large part to the presence of the pancreas. No one has ever noted a hyperglycæmia to which physiological significance can be attached after the administration of insulin. The decrease of liver glycogen may be secondary to the demand for sugar to form muscle glycogen, or for oxidation, and the failure of deposition of liver glycogen may be accentuated by the *decreased ability of the liver to produce dextrose under these conditions.* Deposition of muscle glycogen is so greatly accelerated (Best, Hoet, and Marks) by the presence of an excess of insulin that this process may take preference over a similar one which under normal conditions is also being encouraged in the liver. There may be some mechanism by which this preference is secured which does not involve hypoglycæmia or liberation of adrenaline. This conception may be expressed in other words; there is no evidence that insulin causes, by direct action on the liver, breakdown of glycogen. When the supply of dextrose is adequate liver glycogen is deposited; when insulin is present in excess, less of the sugar may be available for deposition as liver glycogen than when the concentration of the anti-diabetic hormone is lower. The evidence also suggests that the excess of insulin decreases the supply of dextrose by inhibiting its manufacture within the liver. This may result in a lowered glucose "tension" in the cells where liver glycogen is made. If no sugar is being manufactured in the liver and sugar is not administered, one might expect the glucose "tension" to be lower than that required for glycogen synthesis. Liver glycogen may be formed from lactic acid, so it is not established that the "tension" of dextrose is always an index of the amount of material available for synthesis.

ADRENALINE AND LIVER GLYCOGEN

In this discussion we have assumed that adrenaline can cause either breakdown or storage of liver glycogen. There is no doubt that the action of adrenaline is to accelerate the breakdown, but this is not the only effect of this substance.

In 1909 Pollak demonstrated a fall in muscle glycogen and an increase in liver glycogen in starved adult rabbits which were given rather large doses of adrenaline. More recently Cori has provided a more convincing demonstration of this phenomenon, and it appears likely that this is one of the usual physiological rôles of adrenaline. Whether a fall or a rise in liver glycogen is noted, depends on the time of sampling after the adrenaline injection (Luck and Sahyun). A fall is first observed, but the position is later reversed when lactic acid from muscle is built up into glycogen in the liver. Dextrose formed from the lactic acid may be responsible in part for the observed hyperglycæmia. It is only in the animal with intact pancreas that lactate from muscle has been shown to be formed into liver glycogen. This process, which may or may not proceed via dextrose, may be found to take place slowly in the apparent absence of insulin. It is interesting in this connexion to note that after adrenalectomy the recovery of liver glycogen in decapitated cats is accelerated (Evans, Tsai, and Young).

In discussing the hyperglycæmia produced by adrenaline one must consider breakdown of liver glycogen, the supply of lactate from muscle, and the still very debatable question of inhibition of carbohydrate oxidation. If adrenaline were secreted at an increased rate for a short time, one might expect first a decrease in liver glycogen and a hyperglycæmia, a fall in muscle glycogen, and an increase in blood lactate. Some of the lactate may be converted into dextrose, and insulin already available or liberated in response to the hyperglycæmia will facilitate the formation of liver glycogen. Under these circumstances there is presumably no excess of insulin.

INFLUENCE OF OTHER HORMONES

Thyroid.—In 1913 Kramer and Krause, 1924 Kusiyama, and in the same year Burn and Marks showed that liver glycogen could be reduced by repeated administration of thyroid extract. This effect on liver glycogen may be due to an increased activity of the thoracic autonomic nerve-fibres, with possibly liberation of "sympathin" in the liver, or may be in part due to the greater demand of apparently a variety of tissues for oxidisable material. There is, of course, evidence that the adrenals are made more active by thyroxine administration. The interesting work of Burn and Marks on the change in the response of animals to insulin and adrenaline as thyroid feeding is continued, and the correlation of these effects with the state of the liver glycogen, have been reviewed frequently. Interest in the effects of thyroxine on liver glycogen has been increased by the results of the recent work on the thyroid-stimulating hormone of the anterior pituitary. Eitel and Loeser[10] reported that injection of anterior pituitary extracts caused lowering of liver glycogen in normal but not in thyroidectomised guinea-pigs. The time relationships of the action of these extracts in the normal animals was similar to that which holds for thyroxine. It would, however, be unwise to conclude at the present time that the anterior pituitary may affect liver glycogen only through its thyrotropic hormone. As we will see later the diabetogenic fraction may exert an effect directly on the liver.

Pituitary extract.—It is perhaps unnecessary at the present time to consider the rôle of pituitary extract (vasopressin or oxytocin ?), since the balance of conflicting evidence suggests that this substance acts through liberation of adrenaline.

Adrenal cortex.—Numerous reports have been published recently on the rôle of the adrenal cortical hormone in carbohydrate metabolism. After double adrenalectomy in cats the carbohydrate reserves of the liver and muscles are depleted and there may be definite hypoglycæmia (Britton and Silvette).[11] This situation is corrected by providing the cortical hormone and glucose, but the effect is apparently not secured when glucose alone is given. This derangement of carbohydrate metabolism is not observed in some other species after suprarenalectomy, but Britton's recent work has added very necessary support to his contention that, in certain species, a disturbance of carbohydrate metabolism is one of the fundamental effects of cortical deficiency. Hypoglycæmia is, of course, observed in some cases of Addison's disease. It is certain that the next few years will bring us a great deal of new information concerning the effects of the hormone of the adrenal cortex on carbohydrate metabolism. There are many interesting experiments to be performed in adrenalectomised animals maintained by the cortical extract.

The Anterior Pituitary and Carbohydrate Metabolism in the Liver

In view of the signal importance of the work on the relationship of the anterior pituitary gland to carbohydrate metabolism which has been accumulating during the past seven or eight years, a short review will be given here.

The abnormalities in carbohydrate metabolism associated with acromegaly of long standing or with various pituitary tumours need not be discussed. The interesting new physiological work on carbohydrate metabolism might be dated from any one of many starting points. In 1908 Borchardt found that the extract of the posterior lobe of the pituitary raises blood-sugar. In 1911 Cushing observed that pituitary deficiency was accompanied by an increased carbohydrate tolerance. After insulin became available Burn demonstrated an antagonism between "pituitrin" and insulin, and several groups of workers showed that animals were more sensitive to insulin after removal of the pituitary body (Olmsted; Geiling). Attention was focused on the posterior pituitary. The interesting work on the relationship of the pituitary to carbohydrate metabolism conducted in Houssay's department during the last eight years began with the idea that the secretion from the posterior lobe counteracted some of the effects of insulin. Houssay and Magenta[12] presented very convincing evidence, in confirmation of the work quoted above, that hypophysectomised dogs are much more susceptible to insulin than normal animals. Houssay and Potick[13] removed the anterior lobes of the pituitary from toads with the production of hypoglycæmia and increased susceptibility to insulin, and subsequently Houssay and Biasotti[14] found no marked diabetes after complete pancreatectomy in these hypophysectomised animals. A graft of the glandular (anterior lobe) protects them against insulin, while a transplanted posterior lobe does not have this effect. Biasotti and Houssay report that hypophysectomised dogs may exhibit severe hypoglycæmia spontaneously, that they always do after a prolonged fast or injections of phloridzin, and that in some cases very low blood-sugar may be observed even after complete removal of the pancreas. This very striking finding that diabetes is absent or very mild in completely depancreatised dogs from which the pituitary gland has been removed has been confirmed by Regan and Barnes, by Soskin (personal communication), and D'Armour and Keller.[15] The longest survival period reported is six months, but many of these animals may have lived much longer by this time. Sugar and acetone bodies excretion (Rietti) in depancreatised or phloridzinised dogs which have lost their pituitary glands is much less than in otherwise comparable animals with the pituitary intact. Biasotti and Houssay seem to provide good evidence for the suggestion that it is a function of the anterior pituitary to regulate sugar formation from protein and possibly from fat or, in other words, that gluconeogenesis is greatly decreased in the absence of the anterior pituitary. In partially hypophysectomised animals the basal metabolic rate is low (Daggs and Eaton), but according to these workers and to Houssay there is no perceptible change in specific dynamic action of protein. The blood-sugar may be approximately normal and the usual type of carbohydrate tolerance curve may in some animals give normal figures.

Corkill, Marks, and White[8] using rabbits as test animals have recently confirmed many of Houssay's findings in toads and dogs and have extended them in some directions. Hypophysectomised rabbits are very susceptible to insulin and the hypoglycæmia is not easily relieved by adrenaline or vasopressin. Adrenaline is usually less effective in raising blood-sugar in these preparations and the suggestion is made that the glycogen reserves are not readily mobilisable after removal of the pituitary.

ANTERIOR LOBE EXTRACTS

The effects of extracts of the anterior pituitary may now be considered.

In 1926 Johns, O'Mulvenny, Potts and Laughton reported the production of hyperglycæmia in normal dogs which received "protein free" extracts of this gland. Houssay and Pottick found definite diabetogenic effects in toads. Evans, Meyer, Simpson, and Reichert produced diabetes of moderate severity in some, but not all, of their dogs which received daily injections of an alkaline aqueous extract prepared from beef anterior pituitary glands. This work was confirmed and extended by Houssay, Biasotti, and Rietti[16] who, using an alkaline extract of the anterior lobes, were able to produce hyperglycæmia, glycosuria, and acetonuria in normal dogs and rats, in partially depancreatised dogs, and in hypophysectomised, depancreatised dogs. Evans, in 1933, using normal dogs found lipæmia and hyperglycæmia. It is important to note that although pancreatic diabetes is somewhat modified by thyroidectomy in many species, the course of the condition in dogs after this operation is rapid (Yriart). It appears very unlikely on this ground that the anterior pituitary exerts its effect on gluconeogenesis through its thyrotropic principle. Furthermore, Houssay and Biasotti[17] have recently reported that hypophysectomy inhibits pancreatic diabetes in toads after removal of the suprarenals or thyroid. Transplantation of the glandular lobe exerts its diabetogenic effect in the absence of the adrenals or thyroid. While in these experiments both adrenals and thyroid were not removed in the same animal there seems little doubt that the diabetogenic effect was exerted directly on the liver. Campos, Curutchet, and Lanari[18] could not demonstrate the diabetogenic action of anterior lobe extracts in dehepatised toads.

While it is well established that removal of the adrenal medulla or interruption of thoracic autonomic nerve impulses increases the susceptibility of the animal to insulin, the evidence at present suggests that the substance in the anterior pituitary which affects the adrenal causes hypertrophy or prevents the atrophy of only the cortical tissue (Smith).

Anterior Pituitary and Fat Metabolism in the Liver

In 1930 Burn and Ling found that alkaline extracts of the anterior pituitary increased the acetone body excretion in rats, and in 1931 Anselmino and Hoffmann reported an increase in the acetone bodies of rats' blood after the injection of an extract of the anterior pituitary. These workers suggest that a rise in acetone bodies may be produced with these extracts without causing a hyperglycæmia. This work of Anselmino and Hoffmann has been confirmed in large part by Magistris[19] and the rise in acetone bodies has been noted in my laboratory by Mr. J. Campbell. Magistris has studied the increase in the acetone body

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INFLUENCE OF OTHER HORMONES

Thyroid.—In 1913 Kramer and Krause, 1924 Kusiyama, and in the same year Burn and Marks showed that liver glycogen could be reduced by repeated administration of thyroid extract. This effect on liver glycogen may be due to an increased activity of the thoracic autonomic nerve-fibres, with possibly liberation of "sympathin" in the liver, or may be in part due to the greater demand of apparently a variety of tissues for oxidisable material. There is, of course, evidence that the adrenals are made more active by thyroxine administration. The interesting work of Burn and Marks on the change in the response of animals to insulin and adrenaline as thyroid feeding is continued, and the correlation of these effects with the state of the liver glycogen, have been reviewed frequently. Interest in the effects of thyroxine on liver glycogen has been increased by the results of the recent work on the thyroid-stimulating hormone of the anterior pituitary. Eitel and Loeser[10] reported that injection of anterior pituitary extracts caused lowering of liver glycogen in normal but not in thyroidectomised guinea-pigs. The time relationships of the action of these extracts in the normal animals was similar to that which holds for thyroxine. It would, however, be unwise to conclude at the present time that the anterior pituitary may affect liver glycogen only through its thyrotropic hormone. As we will see later the diabetogenic fraction may exert an effect directly on the liver.

Pituitary extract.—It is perhaps unnecessary at the present time to consider the rôle of pituitary extract (vasopressin or oxytocin ?), since the balance of conflicting evidence suggests that this substance acts through liberation of adrenaline.

Adrenal cortex.—Numerous reports have been published recently on the rôle of the adrenal cortical hormone in carbohydrate metabolism. After double adrenalectomy in cats the carbohydrate reserves of the liver and muscles are depleted and there may be definite hypoglycæmia (Britton and Silvette).[11] This situation is corrected by providing the cortical hormone and glucose, but the effect is apparently not secured when glucose alone is given. This derangement of carbohydrate metabolism is not observed in some other species after suprarenalectomy, but Britton's recent work has added very necessary support to his contention that, in certain species, a disturbance of carbohydrate metabolism is one of the fundamental effects of cortical deficiency. Hypoglycæmia is, of course, observed in some cases of Addison's disease. It is certain that the next few years will bring us a great deal of new information concerning the effects of the hormone of the adrenal cortex on carbohydrate metabolism. There are many interesting experiments to be performed in adrenalectomised animals maintained by the cortical extract.

The Anterior Pituitary and Carbohydrate Metabolism in the Liver

In view of the signal importance of the work on the relationship of the anterior pituitary gland to carbohydrate metabolism which has been accumulating during the past seven or eight years, a short review will be given here.

The abnormalities in carbohydrate metabolism associated with acromegaly of long standing or with various pituitary tumours need not be discussed. The interesting new physiological work on carbohydrate metabolism might be dated from any one of many starting points. In 1908 Borchardt found that the extract of the posterior lobe of the pituitary raises blood-sugar. In 1911 Cushing observed that pituitary deficiency was accompanied by an increased carbohydrate tolerance. After insulin became available Burn demonstrated an antagonism between "pituitrin" and insulin, and several groups of workers showed that animals were more sensitive to insulin after removal of the pituitary body (Olmsted; Geiling). Attention was focused on the posterior pituitary. The interesting work on the relationship of the pituitary to carbohydrate metabolism conducted in Houssay's department during the last eight years began with the idea that the secretion from the posterior lobe counteracted some of the effects of insulin. Houssay and Magenta[12] presented very convincing evidence, in confirmation of the work quoted above, that hypophysectomised dogs are much more susceptible to insulin than normal animals. Houssay and Potick[13] removed the anterior lobes of the pituitary from toads with the production of hypoglycæmia and increased susceptibility to insulin, and subsequently Houssay and Biasotti[14] found no marked diabetes after complete pancreatectomy in these hypophysectomised animals. A graft of the glandular (anterior lobe) protects them against insulin, while a transplanted posterior lobe does not have this effect. Biasotti and Houssay report that hypophysectomised dogs may exhibit severe hypoglycæmia spontaneously, that they always do after a prolonged fast or injections of phloridzin, and that in some cases very low blood-sugar may be observed even after complete removal of the pancreas. This very striking finding that diabetes is absent or very mild in completely depancreatised dogs from which the pituitary gland has been removed has been confirmed by Regan and Barnes, by Soskin (personal communication), and D'Armour and Keller.[15] The longest survival period reported is six months, but many of these animals may have lived much longer by this time. Sugar and acetone bodies excretion (Rietti) in depancreatised or phloridzinised dogs which have lost their pituitary glands is much less than in otherwise comparable animals with the pituitary intact. Biasotti and Houssay seem to provide good evidence for the suggestion that it is a function of the anterior pituitary to regulate sugar formation from protein and possibly from fat or, in other words, that gluconeogenesis is greatly decreased in the absence of the anterior pituitary. In partially hypophysectomised animals the basal metabolic rate is low (Daggs and Eaton), but according to these workers and to Houssay there is no perceptible change in specific dynamic action of protein. The blood-sugar may be approximately normal and the usual type of carbohydrate tolerance curve may in some animals give normal figures.

Corkill, Marks, and White[8] using rabbits as test animals have recently confirmed many of Houssay's findings in toads and dogs and have extended them in some directions. Hypophysectomised rabbits are very susceptible to insulin and the hypoglycæmia is not easily relieved by adrenaline or vasopressin. Adrenaline is usually less effective in raising blood-sugar in these preparations and the suggestion is made that the glycogen reserves are not readily mobilisable after removal of the pituitary.

ANTERIOR LOBE EXTRACTS

The effects of extracts of the anterior pituitary may now be considered.

In 1926 Johns, O'Mulvenny, Potts and Laughton reported the production of hyperglycæmia in normal dogs which received "protein free" extracts of this gland. Houssay and Pottick found definite diabetogenic effects in toads. Evans, Meyer, Simpson, and Reichert produced diabetes of moderate severity in some, but not all, of their dogs which received daily injections of an alkaline aqueous extract prepared from beef anterior pituitary glands. This work was confirmed and extended by Houssay, Biasotti, and Rietti[16] who, using an alkaline extract of the anterior lobes, were able to produce hyperglycæmia, glycosuria, and acetonuria in normal dogs and rats, in partially depancreatised dogs, and in hypophysectomised, depancreatised dogs. Evans, in 1933, using normal dog, found lipæmia and hyperglycæmia. It is important to note that although pancreatic diabetes is somewhat modified by thyroidectomy in many species, the course of the condition in dogs after this operation is rapid (Yriart). It appears very unlikely on this ground that the anterior pituitary exerts its effect on gluconeogenesis through its thyrotropic principle. Furthermore, Houssay and Biasotti[17] have recently reported that hypophysectomy inhibits pancreatic diabetes in toads after removal of the suprarenals or thyroid. Transplantation of the glandular lobe exerts its diabetogenic effect in the absence of the adrenals or thyroid. While in these experiments both adrenals and thyroid were not removed in the same animal there seems little doubt that the diabetogenic effect was exerted directly on the liver. Campos, Curutchet, and Lanari[18] could not demonstrate the diabetogenic action of anterior lobe extracts in dehepatised toads.

While it is well established that removal of the adrenal medulla or interruption of thoracic autonomic nerve impulses increases the susceptibility of the animal to insulin, the evidence at present suggests that the substance in the anterior pituitary which affects the adrenal causes hypertrophy or prevents the atrophy of only the cortical tissue (Smith).

Anterior Pituitary and Fat Metabolism in the Liver

In 1930 Burn and Ling found that alkaline extracts of the anterior pituitary increased the acetone body excretion in rats, and in 1931 Anselmino and Hoffmann reported an increase in the acetone bodies of rats' blood after the injection of an extract of the anterior pituitary. These workers suggest that a rise in acetone bodies may be produced with these extracts without causing a hyperglycæmia. This work of Anselmino and Hoffmann has been confirmed in large part by Magistris[19] and the rise in acetone bodies has been noted in my laboratory by Mr. J. Campbell. Magistris has studied the increase in the acetone body content of rabbits' blood, using a modification of Engfeld's method. He believes that the active substance which caused an increase in acetone bodies is not identical with the sex hormone or hormones, with the growth-promoting substance, or the thyrotropic factor. Some of these points require confirmation. We have not as yet been able to obtain any evidence from the literature whether or not it is possible to separate this substance from the diabetogenic material described by Houssay and his collaborators.

It will be readily appreciated that these facts which I have outlined very briefly may necessitate considerable change in our conception of carbohydrate metabolism. It will be appreciated that some of the cases of diabetes which are observed at autopsy—and reliable investigators have stated that these may represent more than one-quarter of the total—have no obvious pancreatic lesion. While it is possible that serial sections of these glands might reveal some abnormalities *it is in the minds of many students* of the subject that diabetes may be caused in these cases, by over-activity of the anterior pituitary. It is perhaps easy to imagine a case of diabetes dying in coma as a result of a sudden increase in the rate of production of acetone bodies from fat in the liver without the production of a pancreatic lesion, but if the diabetes were long-continued, the results of Allen, Copp and Barclay, and Bowie, would lead us to expect that the hyperglycæmia would produce definite changes in the islands of Langerhans. On the other hand, the absence of widespread hydropic degeneration the islet cells in many cases of diabetes in which rglycæmia had been present for prolonged periods gests that in the human organism these cells may resistant to the stimulating effect of high blood-ugar.

These findings appear to give support to those of us who believe that "over-production" of dextrose is the major disturbance in the diabetic condition. It appears quite likely that the utilisation of dextrose by the exercising diabetic dog in the absence of insulin may be abnormal (Yater, Markowitz, and Cahoon)[20] and there may be complicating factors in the human diabetic but I can, as yet, find no escape from the conclusion that the resting depancreatised animal is able to utilise large amounts of sugar. The only hope for those who support the unadulterated "under-utilisation hypothesis" is to find a substance in the anterior pituitary which directly or indirectly inhibits oxidation of carbohydrate. The report of Campos, Curutchet, and Lanari, that the fall in blood-sugar produced by removal of the liver in toads is checked by implantation of the anterior lobe, is worth investigating in this connexion. In the normal state we may consider that the gluconeogenetic process in the liver is accelerated by the anterior pituitary (also thyroid and adrenals) and inhibited by insulin. In the absence of both of these hormones gluconeogenesis is usually sufficient to maintain a normal blood-sugar, but the process does not proceed at an excessive rate. If the thyroid or adrenals or both were also removed from the depancreatised hypophysectomised animal the liver might fail to produce sufficient sugar and fatal hypoglycæmia might occur much as it does in dehepatised preparations.

This field should not perhaps be left without brief mention of some reports of Anselmino and Hoffmann, who state that they have obtained a substance from the anterior pituitary which causes hypertrophy of the islands of Langerhans and the appearance of new islet cells. It would be unwise to make any comment on these results which are not supported by very convincing chemical data until further reports have appeared.

The Liberation of Insulin

Since insulin is one of the most important factors affecting the metabolism of carbohydrate in the liver, the control of insulin liberation is a pertinent question. I do not believe, however, that it is worth while to discuss again in detail at this time the chemical and nervous control of insulin secretion. The evidence seems overwhelming that a rise in sugar content of the blood increases the rate of output of insulin. There are many results which provide circumstantial and several supplying direct evidence for this view. The point which has been debated is whether the sugar acts directly on the pancreatic cells or through an effect on the parasympathetic centres in the hypothalmic region of the brain. The only objection which has been raised to the experiments of Gayet and Guillaumie [21] who added dextrose to the arterial blood supplying a pancreas grafted into the neck of a dog, was that the solution was hypertonic and that the tonicity rather than the sugar content caused the liberation of insulin and the hypoglycæmia. Recently Kosaka has injected 5 per cent. dextrose in saline into the pancreatic artery in chloralosed cats. The accelerated fall in blood-sugar under these conditions as compared to that which follows sugar injections into the portal vein or femoral artery, presumably indicates an increased rate of liberation of insulin. This result does not mean that the rate of insulin liberation is not increased by impulses along the parasympathetic system or that a *not yet* accurately located centre in the brain may not be stimulated to send impulses down the parasympathetic by increasing the concentration of sugar in the blood which bathes it. La Barre's work, of course, provides considerable evidence that this is the case, but Gayet and Guillaumie, who are also familiar with the somewhat exacting technique of cross circulation experiments, have not as yet been able to confirm these results. La Barre's interpretation of his findings may be correct and it has been rather widely accepted, but in view of Gayet's findings judgment must be reserved. There are many experiments which indicate that the vagus is not essential for the secretion of insulin. Other reviewers have recently covered this field.

A subject which holds considerable interest and which may be considered in conjunction with the liberation of insulin is the insulin content of the pancreas.

An investigation of the factors which influence the insulin content of the pancreas (age, diet, infection, &c.) has been slowly but steadily progressing in my department during the past few years. A method which apparently gives maximal yields has been used and considerable information on the insulin content of dogs' pancreas has been obtained. Severe infections may lower the insulin extractable by this procedure (Waters and Murray). We are not entitled to conclude that the rate of insulin liberation is also decreased, but this may well be the case. Our interest in the effects of duct ligation on the insulin content of pancreas was renewed by the reports of Mansfeld [22] that a ligation of the body of the pancreas in dogs which was followed by degeneration of the tail of the gland resulted in an increase in carbohydrate tolerance. Mansfeld believed that the increased tolerance persisted for several years, and that this depended upon the presence in the body of the degenerated tail of the pancreas. Mansfeld's results have been challenged on several grounds: (1) Nather, Priesel, and Wagner find that the increase in tolerance is only temporary; and (2) de Takats and Cuthbert [23] do not believe that the presence of the degenerated tail is responsible. They did not note any decrease in tolerance after removal of the degenerated part and therefore attribute the enhanced tolerance, which they also observe, to a greater activity or an increase in the number of islets in the part of the pancreas where the duct system is intact.

This is quite a different situation to that produced by ligation of the pancreatic ducts, which in the dog is followed by an extensive invasion of the whole gland by fibrous tissue. Generalisation on the effects of duct ligation on islet tissue is not permissible since the findings in different species vary, but the islets survive much better than the acini. In dogs, however, many of the islets eventually share the fate of the acini, and four or five months after duct ligation the number may be obviously less than in the normal gland.

In 1905 Diamare reported that oil injections into the pancreatic ducts of dogs eventually produce disappearance of both islets and acini. Allen and Jorns found similar results after ligation of the ducts. It is well established that some of the islet cells hypertrophy in the first few months after duct ligation, but I find no evidence in the literature that the number in dogs increases at any stage. It is probable that the hypertrophy of those remaining is related to the decrease in number. Wogelmuth has stated that the carbohydrate tolerance in these animals eventually reaches a low level, but, on the other hand, there are numerous but less convincing reports of normal dextrose tolerance curves. In the experience of Waters and myself these dogs may become mildly diabetic three or four months after duct ligation.

The most important point is the effect of duct ligation on the rate and extent of the liberation of insulin, and the evidence suggests that these may be decreased. Our own experiments forced us drastically to revise our previous conception that the insulin content of blood could be studied by the methods at present available. However, a method was developed (Best, Jephcott, and Scott) which appears to give optimal yields and which permits the recovery of added crude insulin from pancreatic tissue. Jephcott and Waters in my laboratory have noted that highly purified insulin is not recoverable by this process. The yield may be as large as 5000 units per kg. of dogs' pancreas, and while the product is not easily purified it may be satisfactorily assayed in a relatively crude form. Waters and I find that the insulin concentration remains at a surprisingly high level after duct ligation. The total amount of insulin in the gland diminishes greatly, however, and pancreas from duct-tied dogs is probably not a good source of insulin for the animal. There is certainly no evidence that the insulin content of the pancreas increases under these conditions. It is, of course, not justifiable to conclude from these results that the amount of insulin liberated, or that the rate of liberation, decreases after ligation of the duct. However, when these findings are considered in conjunction with the results of exacting carbohydrate tolerance tests, the eventual onset of diabetes, and the eventual degeneration of the islets, it appears highly unlikely that ligation of the duct of a part of the pancreas will favour insulin liberation from the affected part. It may be possible to obtain direct evidence whether or not the insulin content of the unaffected part of the pancreas is changed by interference with the duct system of the remainder. The increase in tolerance claimed by Mansfeld and by de Takats is not great. de Takats and his colleagues have been commendably cautious in applying the results of their interesting experiments on animals to clinical diabetes, and their experiences will probably not encourage others to try operative procedures.

(*References at foot of next column*)

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MULTIGLANDULAR DISEASE *

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MUCH as I dislike adding another word to the medical vocabulary, I must do so now, because the hybrid word "polyglandular" can have no place in a lecture to the memory of so sound a classical scholar as the late Dr. Schorstein.

Multiglandular disease means many glands diseased and therefore is not a synonym for pluriglandular disease, which should mean more glands diseased. However, the actual meaning of a name in medicine is not of immense importance, because there is a convention in the way names are used. It is doubtful whether any complaint should be termed uniglandular: Graves's disease, which appears to be primarily a disease of the thyroid gland, frequently has associated with it enlargement of the thymus gland and probably also over-activity of the suprarenal glands. The proof of this overactivity seems to lie in the temporary improvement which follows severance of the nerves. At present the term multiglandular disease is reserved for those conditions in which several internal secreting glands are involved, whilst it is not possible to assert with confidence which gland is affected primarily.

The difficulty in determining which cells are responsible for a disease can be more readily understood when it is realised that a gland may make an excess of its normal product without any increase in its size. Most physicians with experience have seen cases of Graves's disease with great emaciation, tachycardia, protuberant eyes, fine tremors, sweating, and glycosuria without any recognisable enlargement of the cervical lobes of the thyroid gland, and in which X ray examination of the thorax has proved that neither a substernal nor intrathoracic lobe is responsible for the condition. It is true that in these cases histological examination leaves no doubt that there is an excessive activity of cells, but this does not apply to some other conditions which appear to be due to excessive production of an internal secretion.

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* An abstract of the Schorstein lecture delivered at the London Hospital in October, 1933.

Observations upon spontaneous hypoglycæmia provide a good instance. In this rare disease, in which the concentration of sugar in the blood falls so low as to cause symptoms (symptoms which may be so insignificant as a sensation of apprehension or so serious as homicidal *mania*), adenomata consisting of beta cells of the islands of Langerhans have been found and the removal of the adenoma has led to recovery. This finding, however, is far from invariable; in some cases simple hypertrophy of the islands of Langerhans has been demonstrated, whilst in others the most careful examination has failed to discover any tumour or hypertrophy, and removal of a part of the pancreas has not benefited the patient.

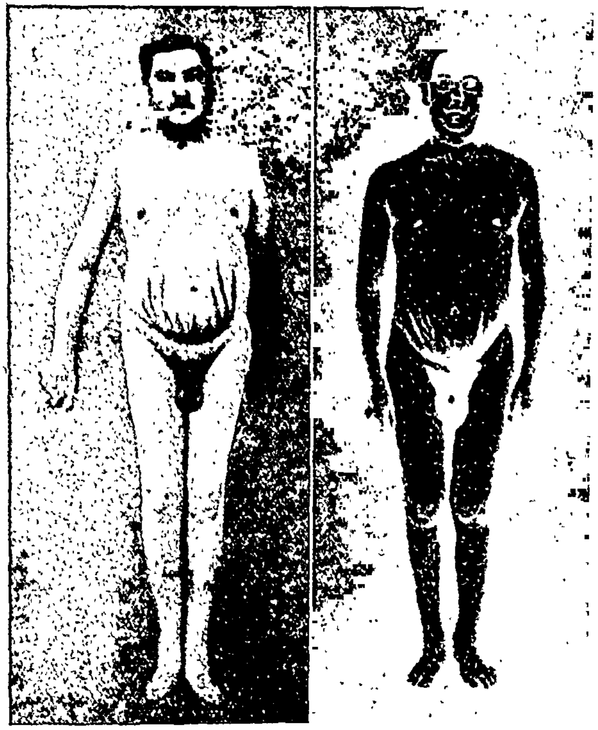

FIG. 1.—On the left: Raab and Krause's case. On the right: Leyton, Turnbull, and Bratton's case.

It might be argued that in all cases of spontaneous hypoglycæmia an excess of beta cells of the islands of Langerhans would be found if the search were complete, but this can be refuted by the evidence we possess.

The pancreas of the normal individual has the capacity of making sufficient insulin to cause death from hypoglycæmia. This has been shown repeatedly when experiments have been conducted with the object of determining the maximum rate at which the healthy individual is able to store sugar when dextrose is injected into a vein. A short time after ceasing the injection profound hypoglycæmia may develop, requiring the administration of sugar over a considerable period; occasionally hypoglycæmic coma has necessitated the injection of carbohydrate into the rectum. Further evidence exists in those patients suffering from diabetes mellitus, who after having been on fixed diets and doses of insulin for months or even years, suddenly develop intense hypoglycæmia causing coma from which they would never emerge if they were not supplied with liberal quantities of sugar. It may be necessary to continue to give carbohydrate in large amounts at short intervals for days or even weeks after the administration of insulin has been stopped. This seems to show that cells which have been underactive for long periods may awaken to dangerous overactivity. It is therefore established beyond doubt that hyperinsulism does not necessitate the presence of an excessive number of the beta cells of the islands of Langerhans.

It may help us to understand multiglandular disease if we accept the principle that a gland producing an excess of its normal secretion or even an abnormal secretion need not necessarily show any morbid change recognisable by present-day methods.

MULTIGLANDULAR DISEASE AND PITUITARY BASOPHILISM

The functions of the pituitary gland are so numerous that as its mystery was gradually unfolded it appeared that the explanation of multiglandular disease would be elicited and the name replaced by "basophilism." Indeed at one time Harvey Cushing[1 2] tended towards that view, because he had collected many cases of the syndrome which had been associated with an excess of basophil cells in the anterior part of the pituitary gland. This view he has modified since cases have been recorded with similar syndrome but lesions in tissues other than the pituitary gland. I yield to no man a greater admiration for the work of Prof. Cushing, and later shall refer to some of the benefits his investigations have bestowed upon patients suffering from multiglandular diseases. It is in no antagonistic spirit that to-day I refer to cases of multiglandular disease due to lesions outside the pituitary and compare them with cases in which either basophil adenoma of the pituitary has been demonstrated, or which have signs which place the diagnosis almost beyond doubt.

I

The first pair (Fig. 1) consists of two men, one described by Raab[3] with autopsy by Krause,[4] and the other a case which was in one of my wards with an autopsy by Turnbull and Bratton.[5]

They both developed their diseases in their thirty-second year; both showed septic foci shortly before the end; both were of more than the average height and the legs of both were long compared with the trunks. The external *genitalia* were normal but both became impotent. The faces and abdomens were obese and the legs slender. Broad purple lineæ atrophicæ radiated from the pubes over the abdomens, probably due to their rapid gain in weight. The main differences which might have been noted during life were that Raab's patient had backache probably caused by kyphosis resulting from osteoporosis. There was no evidence of osteoporosis in my case. In Raab's case the sella showed that the space was becoming larger; in the London Hospital patient the sella appeared to be normal, but he developed hyperglycæmic glycosuria whilst under observation. At the end of November, 1927, his sugar tolerance appeared to be normal, but by the following January the sugar content of his blood after a fast was 0·20 per cent. The blood contained 5,100,000 red cells and 88 per cent. hæmoglobin, proving an absence of polycythæmia which is not an uncommon feature of pituitary basophil adenoma; on the other hand, his blood pressure was 170 mm. Hg. Hypertension is found in the majority of cases of basophilism.

The lesions found at the autopsies were strikingly different. The only common finding was enlargement of the thyroid gland. Krause found an adenoma of the pituitary gland consisting chiefly of basophil cells; there was definite *osteoporosis*; the suprarenal glands had undergone autolysis. In the London Hospital case Turnbull and Bratton found a tumour of the thymus gland which upon histological examination was shown to consist of oat cells and secondary growths in the lungs. The suprarenal glands were greatly enlarged, the cortex more than the medulla. Serial sections of the pituitary gland stained with special methods failed to show any excess of basophil cells.

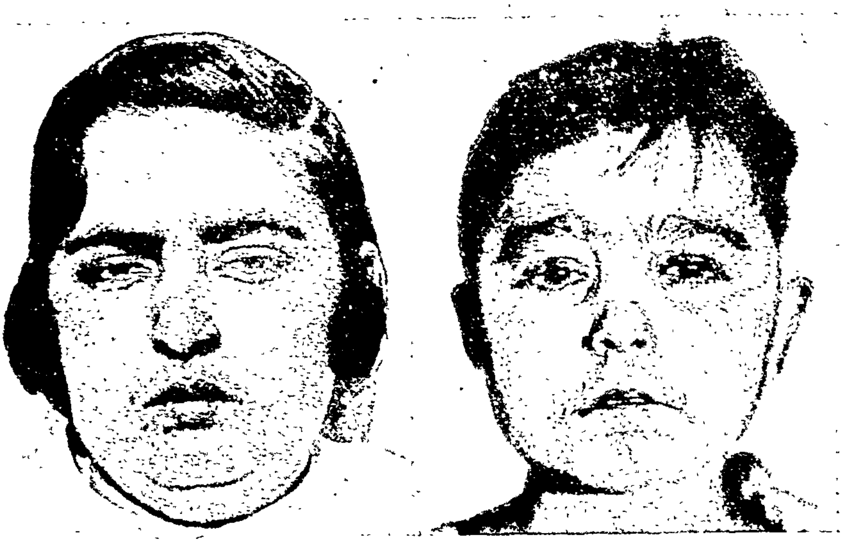

FIG. 2.—On the left: Cushing's suspected case of basophilism. On the right: Case of primary cancer of thymus.

II

The second pair of patients were a girl who was comparatively recently under the care of Prof. Cushing and a boy who was in one of my wards in the latter part of 1927.

The most striking similarities in these cases are the excessive growth of hair upon the face and the protuberance of the abdomen. Both faces became rather bloated through abnormal deposition of fat (Fig. 2). The photographs show excessive hair in both cases—an excess on the upper lip, the chin, and at the sides of the forehead. I shall quote Prof. Cushing's words in the description of the girl.

> "There was precocious adolescence, at 10 years of age, associated with normal menses which continued for three years and then abruptly ceased. . . . She acquired a peculiar plethoric appearance with an abnormal growth of hair on the brows, lip, and chin. . . . She became increasingly abdominous with progressive increase of the purplish striæ atrophicæ" (Fig. 3).
>
> "She had persistent backache and became round shouldered with the loss of 4 cm. in measured stature due undoubtedly to the roentgenologically evident decalcification of the vertebræ and abnormally high calcium elimination. . . . A spontaneous fracture of the pelvic bone, evidently in a tumour, has healed with callus formation. . . . She had a subnormal basal metabolic rate, a lowered tolerance for carbohydrates, and a high blood pressure, presumably indicating secondary involvement or imbalance of other glands—parathyroid, thyroid, pancreatic islets, and adrenal—to almost any of which the syndrome might have been ascribed. . . . Her urine tested by two observers on both rabbits and immature mice proved to contain follicular-stimulating substance indistinguishable in its effect from prolan."

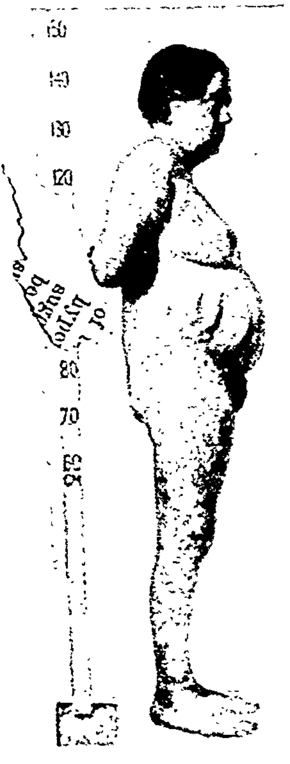

FIG. 3.—Cushing's case (October, 1932) showing abdominal protuberance.

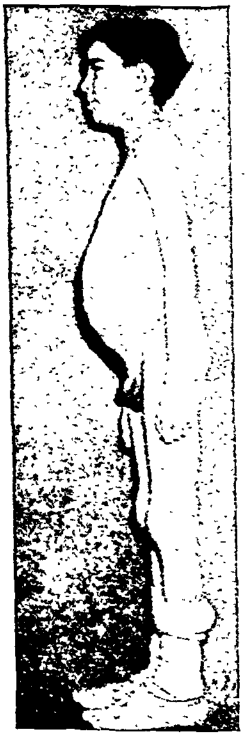

FIG. 4.—Case of cancer of thymus, showing abdominal protrusion.

This patient did not die and therefore the morbid conditions associated with the syndrome have not been placed beyond doubt, but the probable cause may be deduced from the subsequent history which I postpone relating until I have described the parallel case.

The boy, aged 11, had had his appendix removed quite recently in a surgical ward of the London Hospital by Mr. E. C. Lindsay and had made an uninterrupted recovery. Whilst he was at the convalescent home, sugar was found in his urine and his abdomen became protuberant. His facial expression altered so greatly in three weeks that he was not recognised by the sister of the ward in which he had been for the operation. His face was fat and the skin over his cheeks was stretched. He had developed a moustache, with some hair on his chin which formed a meagre imperial, his eyebrows were thick and plentiful, and there was an excess of hair on the sides of his forehead. His legs were long when compared with his trunk, the abdomen protuberant, and the limbs thin (Fig. 4). The genitalia were normal for the age, there was no hair in the axillæ nor on the pubis. He did not develop polycythæmia, nor was his blood pressure above the average normal—conditions comparatively common in basophilism.

Hyperglycæmic glycosuria appeared quite early in this case. Skiagrams of the skull did not show any abnormality of the sella turcica nor any areas of decalcification of the calvarium. It was thought that the diagnosis lay between disease of the pituitary gland and hypertrophy of the suprarenal cortex. Since the patient had hyperglycæmia and skiagrams did not show any displacement of the kidneys I decided that an exploratory operation was not justifiable. The treatment consisted in controlling hyperglycæmia by diet and insulin. When fully controlled he was allowed to leave hospital, but he returned fourteen days later because he had developed severe headache and polyuria. Early in the morning of the day he was admitted he had had a fit. One of the subsequent fits was described by my house physician, Dr. O. Thomas, in the following words :—

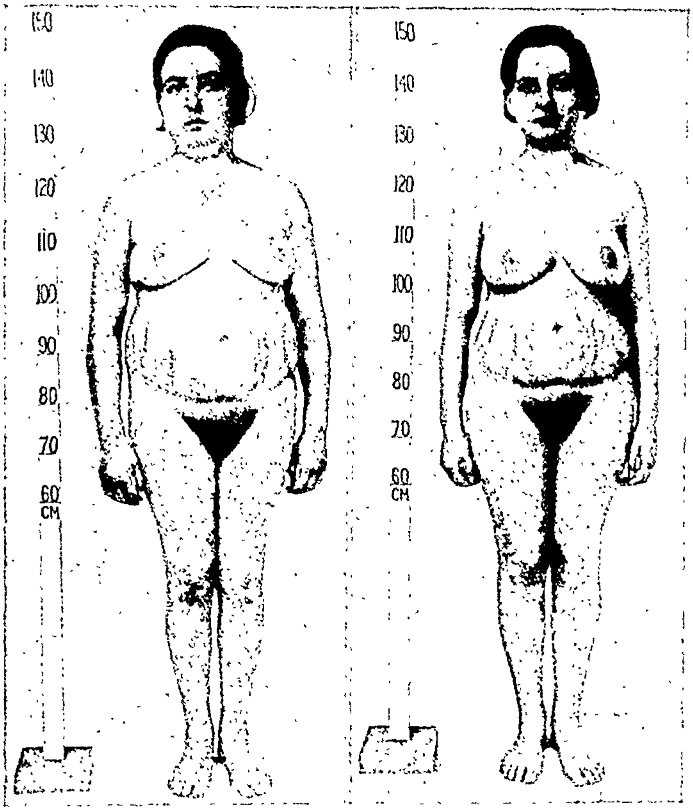

FIG. 5.—Cushing's case. On left: Condition on August 12th, 1932. On right: Condition on March 11th, 1933, after irradiation of pituitary gland.

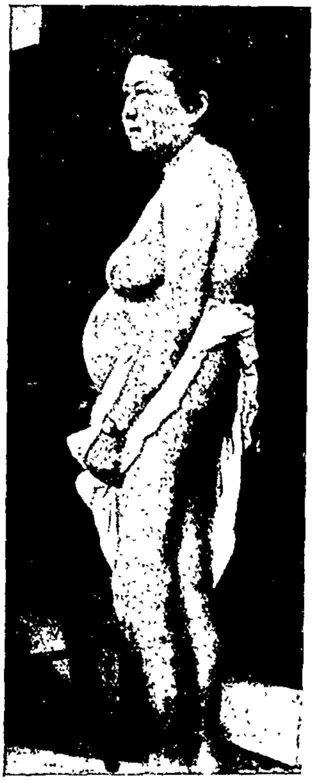

FIG. 6.—Turney's case.

> *Fits started* by slow tonic movements of the left arm and a slow flexion of the left elbow followed by extension. Then the right arm held very rigidly in flexion was drawn up in the front of the chest. The eyes followed by the whole head turned slowly to the left. The left side of the face drawn up. The whole body passed into tonic contraction for about 15 seconds. The pupils were dilated and fixed. The patient became cyanosed. Clonic spasm of all four limbs followed for about one minute, the arms being held in flexion, the right leg was flexed, and the left extended. The position of the legs differed somewhat in different fits.
>
> The pulse was rapid, 120 during the fits. On cessation of the spasm the patient lay quietly and breathed stertorously. The plantar reflex was extensor on the right side and normal on the left side. The urine contained sugar and a trace of albumin. The sugar content of the blood during a fit was 0·25 per cent. and the urea content 0·051 per cent.

These observations make it unlikely that the fits were due to either hypoglycæmia or uræmia, unless one takes the view that so-called hypoglycæmic fits are not due to the lack of sugar in the blood but to a toxic decomposition product of glucose which is usually dependent upon the sugar in the blood falling extremely low. Examination of the cerebro-spinal fluid failed to show any abnormal content.

As already stated, the similarity in these two cases was the excess of hair upon the face, the increase in the size of the abdomen, and the diminished tolerance for carbohydrates. That the girl suffered from basophil adenoma of the pituitary gland seems probable because she improved immensely after irradiation of the pituitary (Fig. 5), and because the gonadotropic substance present in the urine disappeared under such treatment. The autopsy of the boy was performed by Dr. Bratton and the tissues were examined by Prof. Turnbull. The pituitary gland was examined in serial sections with a special staining which proved that it did not contain an excess of basophil cells. On the other hand, as in the case described above, an oat-celled cancer was found in the thymus, with secondary growths in the lungs. In this boy, too, the thyroid was hyperplastic and the suprarenal glands hypertrophied, the size of the capsules being relatively greater than that of the medullæ. The cause of death was not demonstrable at the autopsy, and it was suggested therefore that it might have been due to hypoglycæmia. Arguments against that view have been stated above.

III

A third pair which may be compared consist of the case described by Turney [6] in 1913 and one under the care of Kepler [7] at the Mayo Clinic comparatively recently. Turney described his case very graphically, and all interested in the syndrome should read his description.

> The patient, an unmarried woman aged 25, enjoyed good health until suddenly menstruation ceased and

she began to put on weight rapidly. She had noticed that for two years her legs bruised with undue readiness. Her great trouble was pain in the back due apparently to a kyphotic curve in the upper thoracic region. Although she had a subnormal temperature she preferred cold weather to hot. Her mental condition was normal. Her height diminished from 5 ft. 2 in. to 4 ft. 11½ in., the result no doubt of increasing kyphosis.

The face was florid and fat, the hair dry and scanty. The expression was bright and the manner alert. The skin was dry but not harsh. Axillary and pubic hair was scanty, but there was an excess of hair all over the back. The mammæ were pendulous and the abdomen had the contour of a full-time pregnancy (Fig. 6). Numerous broad lineæ atrophicæ were visible over the abdomen and thorax. The legs were very thin, especially the thighs. Skiagrams of the skull suggested enlargement of the sella turcica. The blood pressure was 200 mm. Hg. Examination of the eyes suggested that there had been small retinal hæmorrhages. The red cells rose at one time to over 8,000,000 per c.mm.

The patient later came under the care of Dr. Parkes Weber [8] and he reported that she had several spontaneous fractures. Abscesses led to death seven years after the beginning of the disease. The autopsy revealed chronic nephritis, fatty infiltration of the liver, and an enlarged left suprarenal gland with a bulky cortex. Nothing abnormal was noted in the pituitary or thyroid glands.

The autopsy was in 1914, long before the small basophil adenomata had been described, but it seems probable that this case was one of basophilism. Kepler's case, on the other hand, although in many respects the signs were similar, proved to be one of cancer of the thymus.

Her last illness began in January, 1932, when she was 46 years old. Before that she had had two operations upon the thyroid, appendicectomy, and drainage followed by removal of the gall-bladder. She stated that she had always had a slight growth of hair on her face, but that it had been insignificant until January, 1932, when it grew rapidly and made shaving daily necessary. At the same time her face became fat and florid. In June, 1932, she developed intense hyperglycæmic glycosuria and hyperthyroidism. Her menstrual periods had ceased at the beginning of the illness. Her legs became thin and weak. The blood pressure averaged 170 mm. Hg systolic and 80 diastolic. A small hæmorrhage occurred in the left retina. The sella turcica was normal upon roentgenographic examination. There were metabolic disturbances leading to alkalosis and also to a fall in the chloride ions in the blood with a fall in the calcium content. The skull was irradiated with apparent temporary improvement.

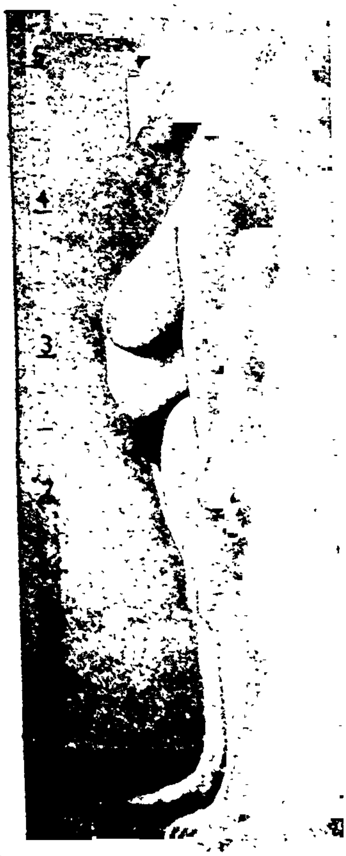

FIG. 7.—Case in the London Hospital.

At the end of June, 1932, she died. Autopsy disclosed a normal pituitary gland both grossly and on microscopic examination of serial sections with special stain. A thymic tumour about 5 cm. in diameter was present. Both suprarenal glands were hyperplastic with a combined weight of 49 g. There was a small abscess in the pancreas. The thyroid showed multiple degenerating colloid and fœtal adenomata in a colloid thyroid with intra-adenomatous parenchymatous hypertrophy.

IV

A fourth pair for comparison are of less value because the diagnosis in one of the cases has not been established by the morbid pathologist. One of the cases was recorded by Dr. Hurst Brown [9] some six years ago, and the other is still under my care. Dr. Hurst Brown described his case as follows.

A woman, aged 45, complained of thirst, disinclination for food, weakness and numbness of the legs, blurring of vision, and sinking sensation in the pit of the stomach. The onset of the disease was menorrhagia, for which she had hysterectomy. When admitted to hospital her face was florid and pigmented, the breasts and chest were also pigmented. Her weight was 12 st. 8 lb.; in other words, she was obese. The urine contained sugar and the reaction to insulin was irregular. X ray examination failed to show any alteration in the pituitary fossa. She became bald but grew hair on the chin and upper lip. She did not develop striæ atrophicæ.

The autopsy revealed a typical oat-celled cancer of about 1 cm. diameter in the lungs. There was hyperplasia of the thyroid gland. The suprarenal cortices were enlarged. The pituitary gland was enlarged and much colloid was found in the large vesicles in the intermediate lobe.

This case may have been one of basophilism with cancer of the lung; but it simulated closely the cases of primary cancer of the thymus and the microscopic appearance of the cells was very similar too.

The other case is a woman presenting many of the characteristics of basophilism. Fig. 7 shows the protuberance of the abdomen, the hypertrophy of the breasts, the absence of fat over the gluteal region, the slender legs, and moderate kyphosis. The patient has hyperglycæmic glycosuria controlled by insulin. She has had her pituitary region irradiated, but the hyperglycæmia has persisted although she reports that she is feeling better.

CONCLUSION

Four cases of multiglandular disease have been outlined which have apparently been due to new growths in tissues other than the pituitary gland; in three of these the primary growth was in the thymus, whilst in one a growth of similar cells was found in the lungs.

At least 14 cases of multiglandular disease associated with basophil adenoma of the pituitary gland have been recorded. The various internal secreting glands involved were—

	Basophilism.	Neoplasm elsewhere.
Thyroid	3	4
Suprarenal cortex	8	4
Parathyroids	2	—
Osteomalacia	5	1
Thymus	0	3

I fear that the data are quite insufficient to draw any conclusion as to the cause of multiglandular disease. Too often the theorist in his study suggests explanation of disease which is proved incorrect by the investigator in his laboratory. It is therefore with all due humility that I suggest further investigation of the suprarenal cortex with new stains which may perhaps show that it consists of cells of slightly different morphological character secreting different substances. Hyperplasia of the suprarenal glands often causes virilism or precocious development of the reproductive organs. In three cases there was great hypertrichosis without virilism. Overactivity of the suprarenal cortex seems to account for the symptoms most satisfactorily. Since Collip[10] has been able to isolate an adrenotropic substance from the pituitary gland it seems within the bounds of possibility that the excess of basophil cells produces an excess of this hormone. Whether other tissues can produce an adrenotropic substance or whether the neoplasms of the cases referred to above stimulate the basophil cells in the pituitary to excessive secretion without causing hyperplasia remains a problem which no doubt will be solved in the near future.

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THE USE AND ACTION OF HISTAMINE IN RHEUMATISM

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IN recent years histamine has been used in the treatment of rheumatism and good results have been recorded, chiefly by continental workers. In 1931 Deutsch[1] demonstrated the use of this substance before the Berlin Medical Society and reports of its use have since been published by Kaufmann,[2] Bettmann,[3] Schenck,[4] and recently by Govaerts.[5] Each of these workers administered histamine by ionisation. Ravina,[6] reviewing the use of histamine, states that Jacchia[7] has given it by subcutaneous injection. Although the subject has received considerable attention, no full account of the use and action of this drug in rheumatism has yet appeared. There is also marked difference of opinion as to the type of case which is suitable for this treatment.[2,3,8]

METHOD AND RESULTS

We have studied the effects of histamine and thio-histamine * in the treatment of a series of 70 adult cases of chronic rheumatism and allied disorders. The series included examples of rheumatoid arthritis, fibrositis, osteo-arthritis, subacute rheumatism, and gout. It was not possible to withhold other treatment (physiotherapy) from these patients; nevertheless the results due to histamine could be easily recognised by the time relation which they bore to the injection.

Histamine was given by subcutaneous injection. The solution was prepared in the strength of 1 mg. of histamine acid phosphate to 1 c.cm. of saline and 0·5 per cent. phenol was added as a preservative. The initial dose was 0·1 mg. (i.e., 0·1 c.cm.), and this was increased daily by 0·05 mg. until definite improvement was observed. A satisfactory dose was usually found to lie between 0·1 and 0·5 mg. This dose was repeated two or three times a week and
further increased if the response diminished.
not usually able to treat patients for longer than fo
but there does not appear to be any reason
treatment should not be continued indefinite
found that the sensitivity to histamine varied in
individuals, and women were usually more sensit
men. As a result the optimum therapeutic dos
be determined in each particular case. Moreo
optimum dose did not always remain constant as
cases slight tolerance was developed. When the
between doses was long (e.g., a week), some i
sensitivity was occasionally observed.

Thio-histamine was given by intramuscular injec
was found to be less potent than histamine. This s
was obtained in ampoules containing 1, 2, or 3 m
initial dose was 1 mg. and this was increased
1 mg. until a satisfactory dose (which was usually
2 and 6 mg.) was found. The injection was repe
or three times a week as described in the case of hi

We found that histamine could produce b
examples of all types of rheumatism, but a
type of case was particularly amenable to th
ment. This type was characterised by the coe
of impaired grip, the result of periarticular
in the hand, with vasomotor symptoms (e.
and cyanotic fingers). Incidentally, some
had previously proved resistant to physiot
There were, of course, individuals who der
benefit from this treatment. These were
patients in whom symptoms of circulatory
were absent.

The heart was examined and the blood pressu
in the case of each subject. We regarded as un
cases with gross heart disease or high blood
Whenever possible the patients lay down for 15–30
after the injection to diminish the liability to h
and dizziness which sometimes occurred. Care w
to avoid chill if a transient rise in temperature
as described below. Histamine in the doses me
did not affect menstruation. As an extra pr
adrenaline, the physiological antidote to histamine
hand. We may add, however, that we never had
to use it. Observations were made upon the bo
perature, pulse- and respiration-rates, blood press
surface temperature (by the thermo-couple and g
meter method).

The following account of the effects of hista
rheumatic patients applies equally to thio-hi
given in appropriate doses. The response to hi
varied from patient to patient, and even in t
patient at different times. The following is
all the effects which were observed : flushin
of pain, increased range of joint movement,
vasomotor symptoms, sweating, headache, di
drowsiness, increased appetite, a sense of wel
changes in blood pressure and temperatur
paræsthesiæ.

Flushing.—Although relief of symptoms is t
important of these phenomena therapeutically
ing appeared first, was the most constant a
often striking. It generally occurred within
minutes of injection, and lasted from fifteen t
minutes. With the smaller doses the flushi
confined to the face and neck. With the large
flushing was accompanied by erythema and a
of warmth over the whole body, but the
generally an interval between the facial flush
occurrence of general bodily warmth. Someti
flush had a patchy or mottled distribution o
face and neck. In a number of cases flushing r
later in the day, either without obvious ca
evoked by some stimulus such as a hot drink.

Relief of pain and increased movement.—Pa
relieved and movement of joints increased, oft
surprising degree. This occurred in a few m
Occasionally, a few hours, and more rarely a fe

---

* The British Drug Houses Ltd.

elapsed before improvement appeared. The response was frequently dramatic. For example, a patient unable to close his hand owing to limitation of finger flexion would close the fist completely within a few minutes of the injection. Again, a knee-joint would be fully extended after having been partially flexed for years. In some cases definite relaxation of muscular spasm occurred, and this was most strikingly demonstrated in the case of the sternomastoids. It is necessary to point out that dramatic increase in movement did not as a rule last longer than a few days. The benefit, however, did not entirely disappear, a small but definite improvement persisting, to be added to by the effect of subsequent injections.

Relief of vasomotor symptoms.—Vasomotor disturbances were common and consisted of sensations of coldness in the extremities or all over the body, and pale or cyanotic hands, with or without trophic changes. Histamine relieved these symptoms in almost every case. A sensation of body heat was frequent. This occurred soon after the flushing of the face and even when erythema was not visible. After a few hours it would subside, a lesser degree of warmth often persisting for several days. We have frequently seen both cyanotic and deathly pale hands rapidly take on a healthy pink colour and perspire freely, the patients declaring that they feel "alive" and warm again.

The remaining effects which may follow an injection of histamine, although less important therapeutically, are of considerable interest from the physiological point of view.

Headache and dizziness.—A slight degree of fullness in the head or headache with or without dizziness was not uncommon, and lasted from a few minutes up to half an hour. Occasionally it would begin with violent throbbing and persist as a dull ache for several hours. It was not directly proportional either to the size of the dose or to the amount of flushing: a marked flush was sometimes followed by no headache at all, and a slight flush by a marked headache. It was not usually sufficient to cause undue inconvenience, but when necessary was easily relieved by aspirin. The headache and dizziness, when they occurred, were generally felt within a few minutes, but in a number of cases there was a latent period of many hours. They could generally be mitigated if the patient lay down for half an hour after the injection.

Sweating.—Sweating occurred less commonly than the effects already described. It usually appeared within a few minutes of injection and frequently was localised to the palms of the hands. More rarely the onset of sweating was delayed for some hours, occurring perhaps during the night, sometimes profusely.

Drowsiness.—Patients often experienced a feeling of drowsiness within several hours. As a rule this was slight and of short duration. In a few cases the drowsiness led to a strangely deep sleep, from which the patient awoke after a few hours very refreshed.

Appetite and well-being.—A sense of well-being was frequently noted. When the injection preceded a meal there was occasionally a marked increase in appetite. These effects rarely lasted longer than one or two days.

Blood pressure.—With histamine a fall in blood pressure commonly occurred to the extent of 20–40 mm. Hg, but this never lasted longer than five minutes. In cases complicated by high blood pressure the fall was greater. With the smaller doses of thio-histamine the blood pressure was only rarely affected.

Temperature.—A rise in mouth temperature up to 1·5° F. was often recorded. In a few cases, however, the temperature fell. A typical chart shows that the maximum change occurs within half an hour and the temperature returns to normal fifteen to thirty minutes later. These findings were quite inconstant. We found that not infrequently the mouth temperature varied as much as 0·5° F. between successive readings taken at five-minute intervals, apart altogether from the administration of histamine. This led us to observe the temperature at intervals of a few minutes before as well as after the injection. Our remarks apply only to those observations which were thus controlled. The skin temperature of the cheek rose considerably and in one case approximated mouth temperature.

Pulse and respiration.—The pulse-rate was as a rule either unchanged or slightly increased. The respiration-rate was never affected.

Paræsthesia.—Some kind of paræsthesia was occasionally met with. This took the form of tingling or burning in various parts of the body. It was always transient and caused no discomfort.

Apart from the needle prick the injections were painless, and untoward symptoms never arose.

CASES ILLUSTRATING THE EFFECTS OF A SINGLE INJECTION

Woman aged 41; rheumatoid arthritis 18 months' duration. Walked with two sticks on account of flexion of the knees. Sixth injection, 10 A.M., 5 mg. thio-histamine intramuscularly. Within a few minutes, slight flushing of the face and warmth of body occurred. In twenty minutes the patient felt looser behind the knees, which showed increase in movement. Walking was markedly improved. No headache, but slight drowsiness all day. The following morning the improvement had largely disappeared. A small but definite benefit, however, persisted. In this case the mouth temperature rose 1° F. within fifteen minutes and returned to normal fifteen minutes later. No acceleration of pulse or respiration.

Man aged 59; fibrositis and arthritis of many years' standing. Swelling of small joints of fingers and pale clammy hands; unable to close fists completely; always feels cold and says "nothing ever warms me." Second injection, 11 A.M., 0·15 mg. histamine subcutaneously. Face flushed and body felt warm. The hands also became warm, the colour changing from white to pink, and he was able to close his fist completely for the first time in many months. These effects occurred within a few minutes of the injection and had not disappeared four days later, when the next injection was given. He also experienced general well-being and a temporary increase in appetite.

IONISATION

The administration of histamine by ionisation was first introduced by Deutsch in 1931,[1] and has recently been described in detail.[9] The positive pad is soaked in a 1 in 5000 solution of histamine. A treatment usually lasted twenty minutes, and at the end of this time the skin under the positive pad was red, hot, and usually blistered. We found that therapeutic effects were purely local and were apparently the result of local galvanism, heat, and counter-irritation. Pain and swelling were relieved in all types of cases. The most striking results were obtained in cases of chronic arthritis of knee and ankle joints which had recently flared up with increase of swelling. With regard to general effects, flushing of the face and headache often occurred but general therapeutic effects were absent.

We wish to express our thanks to the honorary physicians of the Harrogate Royal Bath Hospital for their interest and encouragement throughout this work. Also to Prof. B. A. McSwiney, of the University of Leeds, for helpful advice and criticism. One of us (C. G. E.) is in present tenure of the Worswick fellowship of the University of

Manchester. Some preliminary work was done in the clinical research department of that University, and thanks are due to the director, Dr. J. F. Wilkinson, for continued interest.

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THE CLINICAL APPLICATION OF HISTAMINE IN RHEUMATISM

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HAVING been one of the first to employ histamine as a routine treatment for various rheumatic conditions, it may be of interest to explain its clinical application. In a recent note by Bisset and Woodmansey[1] the theory and the results of various investigations were set forth, but there is perhaps need for a fuller description of the practical findings.

It is essential that a suitable type of case be selected for treatment, such being osteo-arthritis, rheumatoid arthritis (not in the acute stage), chronic villous arthritis, fibrositis, and neuritis. An opportunity of observing the reaction of the gouts has not occurred, but other writers[1] have reported good results. Similarly, its use has been proved in intermittent claudication,[2] and in muscular atrophy due to trauma and disuse.[3] It has no place in the treatment of infective arthritis or acute rheumatoid arthritis, or where there is marked failure of compensation in the heart.[4]

The course of the disease in most cases appears to be uninfluenced[5] by histamine, but there is no doubt that its use accelerates recovery from those conditions which can definitely be cured, such as fibrositis and neuritis. In a long series there have been extremely few failures, a result which can in the main be ascribed to two causes—namely, careful selection and personal application of the treatment. The method is one requiring such unremitting attention to every phase, on account of the daily variations in the reaction of the same patient, that it does not seem practicable to delegate the administration, in the form of a prescription, to a second person. But if these two requirements are satisfied, and if the use of histamine is combined with suitable bath treatment, the results unquestionably surpass those obtained with previous methods.

The histamine which has been used is that prepared by Hoffmann-La Roche in the form of tablets and electrolytic ointment. The tablets, which are used for making a stock solution of the required strength, were early discarded in favour of the ointment, which seemed to give better results and was much more convenient to use. At the present time it is employed in two ways: ionisation and massage.

IONISATION

The affected part is smeared with ointment without any preliminary cleansing. The use of benzene has been advocated by Spicker,[2] but after an extensive trial there seemed to be no advantage in removing the surface grease, and this has been discontinued. A lint pad, wrung out of saline, is placed in the usual way over the part and connected to the anode of the apparatus. A similar pad, connected to the cathode, is applied to the body either in an indifferent place or with the idea of getting a definite "through and through" effect, although the advantage of this has not been proved. The amount of current used vastly exceeds that advocated by other workers, who rarely go beyond 15 milliampères, whereas I always give each patient the maximum which can be tolerated, and this frequently amounts to 100 and 150 ma. The current is raised to the maximum as rapidly as may be compatible with comfort, and is maintained at the greatest height the patient will allow during the remainder of the sitting, being at the end of that time cut off without hesitation.

The amount of current which a patient will tolerate varies enormously from day to day, and unless the maximum current is given for each sitting the greatest benefit is not being received. The amount of current passed does not seem to bear any relationship to the size of the pads, except where a very small area is being treated, when there is naturally a concentration. The patient immediately announces a tingling and intense itching at the site of the anodal pad, and this may gradually increase, may remain stationary, or may rapidly lessen. It is frequently noticed that these symptoms pass off as the current is increased. There is an accompanying feeling of local warmth, and the patient must be told how to distinguish between this and the burning caused by the concentration of the current in one spot. He is told also to complain at once if the limb begins to throb, if the face flushes, or if there is pain in the head. The flushing of the face must, however, be looked for by the operator from the passing of the first milliampère, frequently becoming apparent a few moments before the patient realises its presence, and those few moments may mean the avoidance of a bad headache, as it is on the first suspicion of a flush that the current is cut off. This may take place after three minutes or not until 20 or 25 minutes have passed.

When the patient complains of throbbing or excessive heat the current is reduced the necessary amount to stop these phenomena. When the current is cut off a well-marked urticaria is found under the anodal pad, corresponding to it in size or irregular in shape; it may be discrete or may have coalesced to form a raised plateau. There is violent itching, which is allayed by dusting with talcum powder and usually passes off in a few minutes to half an hour. The rash itself often fades rapidly and has not been found to remain longer than 130 minutes. It is advisable where possible completely to surround the part with the anodal pad, and an arm or foot bath can be used as the positive electrode for treating an extremity which has been well smeared with the ointment or can be used to replace the cathodal pad.

With the treatment the patient experiences an immediate relief from pain, either complete or partial, and can demonstrate a greater range of movement where previously there was restriction. This lessening of pain is always present and may last a few hours, a few days, or permanently. In addition, there is a feeling of local warmth and general well-being. The undesirable results which must be carefully watched for include headache or a feeling of fullness in the head, tachycardia, a feeling of constriction in the chest with consequent breathlessness, burning, and faintness, any one of which is an indication for the immediate cessation of the sitting. Treatment may be given daily.

MASSAGE

The ointment has given excellent results when used as a basis for massage in fibrositis and chronic villous arthritis, but in these cases it is necessary to make allowance for the natural benefit resulting from the massage alone. There is, however, no doubt that the addition of histamine produces markedly superior results.[6] In a few minutes patches of urticaria appear, but they rarely exceed the size of a split pea and are not usually numerous. Symptoms of toxicity likewise are seldom seen. On the whole results are less satisfactory than when ionisation is used, but where massage is desired histamine can advantageously be employed, and it may safely be used in cases of failing compensation which cannot have ionisation. It has not been observed with Spicker[2] that "the greatest rash appears in the painful areas while those not affected hardly react." Neither the practice of scarifying the skin before inunction as advocated by Vas,[7] nor the method of injecting histamine peri- or intra-articularly by the technique of Vezér,[4] Faber,[8] and Jacchia[3] have been attempted, mainly because the results by other methods have been eminently satisfactory. A preliminary exposure to infra-red rays appears to be beneficial.

ILLUSTRATIVE CASES

CASE 1.—Fibrositis, mainly in back and knees. Duration 15 years. Patient had always received benefit from spa treatment, but returned each year in the same condition. In 1932 there was considerable improvement with various baths, douches, and massage, but on returning in 1933 was found to have relapsed. Again had baths, massage, and infra-red radiation, but was making no progress. Was given ionisation with histamine to the lumbar region for 10 minutes, current up to 45 ma., and at the conclusion of the application was found to be free from all pain in the back, and similarly at the next two sittings the knees were also painless. Treatment was repeated on five further occasions. Now, six months later, the patient reports that there is still freedom from pain and that she has not felt so fit for many years.

CASE 2.—Neuritis of traumatic origin, duration two months, caused by playing badminton. When seen there was slight loss of extension of the right elbow, with considerable neuritic pain, aggravated by attempts to extend the joint. Ionisation with histamine was given on seven occasions, each time with a further reduction of pain and an increasing range of movement. Where the intervals between the treatments were unusually long (four to five days) there was some tendency to retrogression, but the ultimate result was a complete and so far permanent restoration. Two other similar cases have given equally good results, one of them requiring only three sittings.

CASE 3.—Fibrositis and chronic villous arthritis. Long history with periods of remission following spa treatment, but gradually getting worse. Complete freedom from pain in knees with one treatment, the first time they had been painless for years. One knee has now remained free from pain for six months, but the other has relapsed owing to a fall and now is having daily either ionisation or massage with histamine. There is a very gradual improvement. In the same case a very severe fibrositis of the entire back is likewise yielding to similar treatment, but this is a case in which repeated applications appear to be required, something like 200 treatments having been given to the back and knee. After each sitting there is definitely a decrease in the pain, but there has not been the dramatic result which is got in the majority of cases.

CASE 4.—Osteo-arthritis of the left hip. Long history with much treatment at various places, but never freedom from pain. Completely free from all pain after the first application by ionisation, and could demonstrate the improvement by climbing stairs properly for *the first time* in many years. Was given seven further treatments and now, after four months, reports a continuance of the benefit.

CONCLUSIONS

(1) Histamine has a definite place in the treatment of fibrositis and neuritis, and in all chronic rheumatic affections associated with pain and limitation of movement. (2) With histamine it is possible completely to cure fibrositis and neuritis, and almost invariably to decrease or remove joint pains in other suitable cases. (3) The process of ionisation with histamine requires unremitting attention during the whole of the sitting and, even more important, the tolerance of a given patient both as to time and milliampèrage varies greatly from day to day.

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Clinical and Laboratory Notes

RETROPERITONEAL CYST

By H. L. GREGORY, M.B. Camb.
SURGEON TO HORNSEY CENTRAL HOSPITAL; AND

L. M. MAYERS, M.R.C.S. Eng.
PHYSICIAN TO THE HOSPITAL

A MARRIED woman of 31, nullipara, after 21 months' amenorrhœa, consulted one of us (L. M. M.) on account of abdominal pain of a flatulent griping character, which was aggravated since she had taken aperients.

She was found to have an abdominal tumour as large as a six and a half months' pregnancy. It was median in position, pyriform in shape, elastic in consistence, with no evidence of fœtal parts to be detected, and arose from the pelvis. Vaginal examination disclosed the fact that the uterus was in front of the tumour, which extended into Douglas's pouch and felt definitely cystic. There had been none of the subjective signs of early pregnancy, and the cervix uteri was not softened; the question of extra-uterine pregnancy was dismissed from consideration and a diagnosis of ovarian cyst was confidently made.

She was admitted to Hornsey Central Hospital, and after the usual preparation the abdomen was opened by paramedian incision. Attempts to deliver the cyst on to the surface were completely frustrated by the colon, which was tightly stretched and closely adherent over the front of it from the right iliac fossa to the splenic region. In the belief that it was the transverse colon separation was begun from below, dividing what appeared to be peritoneal adhesions and swabbing the bowel upwards, but there was so much bleeding from the vascular subperitoneal tissues that this could not be continued. The cyst was therefore tapped and emptied. The content was about 3 pints of dark chocolate-coloured slimy fluid, suggesting that recent hæmorrhage into it had caused the rather sudden onset of symptoms.

The cyst was unilocular, and after emptying, its wall became obvious and it easily shelled out of its surroundings, having no connexion with either ovary. When it was gone, we found that instead of transverse colon we had been dealing with the sigmoid loop, whose vascular supply passed upwards on the left face of the cyst, and that now there was about a foot with no mesenteric attachment. Resection and end-to-end anastomosis were done, and as the patient's condition was becoming bad, done very hastily. During the suturing pulse and respiration were imperceptible and the abdomen was quickly closed, after running an œsophageal tube per rectum to 6 in. above the anastomosis. By this time the assiduous efforts of the anæsthetist were rewarded, and she went back to the ward with a pulse of 160.

Subsequent progress was anxious, but steady. Saline solution was given by drip through the inserted tube for 48 hours. She was then able to sip ʒii–℥ss. For eight days she had nothing more by mouth than fruit juice, glucose, Russian tea, and paraffin, and during the first

12 days she passed fæcal fluid by the tube, which was then extruded. She has had no symptoms of obstruction nor any other trouble since.

No ovarian tissue was found in the cyst wall, which was uniformly thin. The lining epithelium was not microscoped. The cyst may have arisen from the parovarium and lifted the posterior layer of the broad ligament and pelvic peritoneum as it increased; if not, its origin is obscure.

AN UNUSUAL REACTION TO NIRVANOL

By Charles S. D. Don, M.D. Aberd., M.R.C.P. Lond.
HONORARY PHYSICIAN TO SALFORD ROYAL HOSPITAL AND TO THE ROYAL EYE HOSPITAL, MANCHESTER

The treatment of chorea by phenyl-ethylhydantoin was introduced by Roeder[1] in 1919, and numerous papers dealing with this have appeared in English medical literature.[2–9] This drug, better known as Nirvanol, gives rise in many cases to a morbilliform rash, pyrexia, and a rise in the pulse-rate; sometimes, as mentioned by Poynton and Schlesinger,[3] cervical adenitis, drowsiness, conjunctivitis, pharyngitis, slight œdema of eyelids and face, and headache may also be observed. Ashby[6] has observed incontinence of urine. The temperature may even rise to 104° F. and remain so for four to five days, and at times, as in the case reported by Sehestedt,[10] a secondary rash may appear when the patient is convalescing from the typical nirvanol rash. Lesigang[11] and Whitaker[9] were able to induce a mild pyrexia and a rash in cases which had had nirvanol previously by giving a single dose to such patients. Murray-Lyon,[2] Lesigang,[11] and others have observed idiosyncrasies to nirvanol, and Keller[12] reported a case with high fever, headache, scarlatiniform rash, swelling of face and mouth, enlargement of spleen and liver, jaundice, and diarrhœa. Jones and Jacobs[7] had one case which became comatose, with bleeding from the nose and gums and a pyrexia lasting 11 days, the temperature rising to 101° F.

In the large majority of cases nirvanol in ordinary doses may be used with confidence and without fear of ill-effects. In the case here reported the patient appears to have had an idiosyncrasy to nirvanol and the temperature rose to an unexpected height and persisted for nearly three weeks.

This patient, a girl of 11 years, who had never had nirvanol previously, was suffering from chorea of moderate severity; she was of average height, slightly under the average weight, and she had a well-marked mitral presystolic murmur. She was given 0·3 g. of nirvanol on Jan. 9th and again on the 10th, and on the 11th a scarlatiniform rash appeared on the chest, the face was flushed, and the temperature rose to 102·4° F., the rise lasting two days. Six days later, as the choreic movements had improved to some extent, she was again given 0·3 g. of nirvanol on three successive days, when it was stopped as a scarlatiniform rash had reappeared; the temperature rose to 103·6° F. The rash lasted four days, but the temperature continued to be elevated, rising every evening, sometimes to 105° F. and rarely below 103° F., dropping frequently to normal in the mornings. This continued for 19 days. The face was flushed and slightly swollen, a little like an erysipelas, and she had headache. The glands in the cervical region, the axilla, and the groin were enlarged, the spleen gradually increased in size, and the lower margin could eventually be felt 2 inches below the ribs; the pulse was always over 100, and the presystolic murmur completely disappeared. The child was drowsy but did not appear to be desperately ill at any time. The temperature remained permanently normal after the nineteenth day of pyrexia, and the enlargement of spleen and glands disappeared in the course of the following week. She was discharged two weeks later much improved. It was difficult to detect the presystolic murmur at the time of her discharge.

A blood examination did not show an increase of eosinophils at any time. Most writers have observed eosinophilia, although Marick[4] did not find it to be often present. Two blood cultures taken at the height of the temperature were sterile. Agglutination tests were negative. X ray of chest showed no lesion such as Jones and Jacobs[7] noted in the unusual case which they reported.

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SUBCUTANEOUS EMPHYSEMA IN A CASE OF BRONCHIAL ASTHMA

By F. Churchill Davidson, M.C., M.B. Edin., D.P.H.

The patient, a girl 9 years of age, had an eight years' history of bronchial asthma, each attack usually lasting only 24 hours. On March 5th, 1934, at 2 A.M., during an asthmatic attack, she had a spasm of severe coughing during which she experienced a sudden sharp pain in the front of the left upper chest. The pain lasted only a few seconds and she fell asleep again. She slept until 8 A.M., and on waking found her neck was "stiff and painful." On examination it was found that there was extensive subcutaneous infiltration of air into the upper part of chest and back, both shoulders, both arms as far as dorsum of hands, the angles of jaws to clavicles, and both sides of lower half of face. The appearances of the neck resembled infective parotitis (which diagnosis was actually suggested by the child's parent). There was considerable tenderness over the area of swelling, and the typical crepitations of subcutaneous emphysema were easily palpable. The child stated that she felt "cracklings in the ears" when she swallowed. Physical examination of lungs showed those signs associated with asthma—generalised sibili, &c.; there was no evidence of pneumothorax or other pathological lesion. The child felt ill for 24 hours, with slight cyanosis, shortness of breath, a pulse-rate of 120, and a temperature of 100° F. The asthma was relieved quickly by a few doses of Ephedrine syrup, and recovery was complete in a week, the subcutaneous emphysema disappearing slowly and completely. X ray examination could not be arranged but the child was seen by Dr. R. C. Wingfield, Brompton Sanatorium, who confirmed the diagnosis.

From the history of this case it is evident that the air escaped from a rupture of alveoli of left lung into interstitial lung tissue, and from thence via mediastinum to the neck. There was no evidence of any rupture of intercostal muscles.

Camberley, Surrey.

MEDICAL SOCIETIES

FELLOWSHIP OF MEDICINE

DEBATE ON THE TREATMENT OF PEPTIC ULCER

At a special meeting of the Fellowship, held at Manson House, London, on May 30th, with Lord Moynihan in the chair, a discussion took place on the motion "that, in the absence of complications, surgical interference in cases of gastric and duodenal ulcer is unnecessary."

Dr. A. F. Hurst, in proposing, said that ten years ago the chairman contended that an ulcer of the stomach large enough to produce a crater demonstrable by X rays could not be cured except by operation. About that time the speaker saw the largest gastric ulcer in his experience, and as a challenge to the prevailing view, he decided to treat it by medical means, warning the patient that the treatment would take a long time. In three months the symptoms had disappeared, and for years afterwards they did not return. To be effective, however, medical treatment must be thorough and prolonged. Duodenal ulcer presented a more difficult problem than gastric ulcer, largely because the duodenum was narrower than the stomach, and slight swelling or spasm sufficed to cause obstruction. Nevertheless he found it very rare for a patient who had had an established ulcer for less than ten years not to get well under medical treatment. An exception to this rule was the familial type of case, in which hæmorrhage began early in life, and the only effective measure seemed to be a large gastrectomy. Some advocated operation in order to prevent hæmorrhage or perforation; but he had never seen perforation in a case in which the patient had had proper medical treatment over a sufficiently long time. It was also said that a poor patient could not afford the time spent on the medical régime. But unfortunately there was no rule which confined major surgery to skilled surgeons, and while in the hands of the latter the operative mortality averaged about 1 per cent., for the whole country it was about 5 per cent.—a very real risk to face.

Mr. A. E. Mortimer Woolf said that while he supported the motion as it stood, he did not think the converse was true—namely, that all peptic ulcers, in the absence of complications, should necessarily be treated by the usual medical means. It had not been his experience that perforation did not occur while the patient was having adequate medical treatment. The question of hæmorrhage was very difficult; on the whole, he thought, hæmatemesis in gastric ulcer was rare, and in the presence of such bleeding it was advisable to look for some other condition. Where there was evidence that an ulcer had involved a vessel, the hæmorrhage must be treated in the same way as bleeding anywhere else. The cases which he considered should be operated upon were: those with an anatomical deformity, such as pyloric stenosis, hour-glass stomach, or adhesions; those in which there was a suspicion, or at least a possibility, of carcinoma; and recurring ulcers. In a straightforward case of ulcer without complications he would not advise operation without first trying other methods. He had seen surprisingly good results in cases he had treated by duodenal intubation.

Dr. Robert Hutchison said that many years ago he had crossed swords with Lord Moynihan and said that many unnecessary operations were performed for duodenal ulcer. His change of view had come about from observing the admirable operative results obtained by Mr. James Sherren at the London Hospital—results not approached by any medical series. He was astounded that Dr. Hurst should say that every case of uncomplicated gastric ulcer which was properly treated medically would heal, and with proper care remain healed. In *Guy's Hospital Reports* in 1928 Dr. L. J. Barford described the end-results in 160 cases of gastric and duodenal ulcer treated at the New Lodge Clinic. For gastric ulcer the results were said to be satisfactory after five years or more in 39 per cent., and fairly satisfactory in 13 per cent., and one-third of these had recurrences. The duodenal ulcer cases were regarded as entirely satisfactory in only 41 per cent., and fairly satisfactory in 28 per cent.; there were 24 per cent. of recurrences, and more than half the latter had had to come to operation. At St. Thomas's Hospital there had been nine cases of dangerous alkalosis in patients undergoing intensive alkaline treatment, and one of them was fatal. Dr. Hutchison contended that patients who had been operated upon could live a freer life than those who had medical treatment, which, with its rigorous restrictions and regulations, meant a condition of invalidism, not health.

Mr. Herbert Paterson said he did not approve of duodenal intubation; it was based on unsound principles, and it accomplished nothing which could not be secured by ordinary dieting. He agreed with Dr. Hurst that medical treatment must be adequate, much of the so-called treatment of ulcer at the present day being merely haphazard. Ulcer required months, not merely weeks, to heal. In his own view very great care was needed by patients for at least a year after gastric operations; most of the failures were due to neglect of this precaution. Gastric ulcers could be healed under medical treatment, but he doubted whether the same was true of well-established duodenal ulcers. In three cases he had seen perforation in hospital while the patient was undergoing medical treatment, and some years ago he had followed up 180 cases which had had proper medical treatment, 107 of which (60 per cent.) had relapsed. He was convinced that the risk of operation was less than the risk of hæmorrhage and perforation, and he thought that at least 90 per cent. of cases of duodenal ulcer could be cured by a properly performed gastrojejunostomy, provided patients were properly advised about their subsequent diet. In the last 20 years he had had 11 medical men patients who preferred medical to surgical treatment, and 3 of them had had perforations, one with a fatal issue. The motion before the meeting was untenable for four reasons: (1) it was contrary to experience that a large ulcer would heal if treated medically; (2) duodenal ulcer seldom or never healed; (3) septic foci, in the appendix for example, must be removed surgically; (4) cases of achlorhydria needed gastrectomy.

Dr. Mather Cordiner maintained that every gastric ulcer would respond to medical treatment provided there was no question of malignancy. Often malignancy could be detected radiologically and in such cases medical treatment should not of course be attempted.

Dr. Ernest Young spoke of some cases with very large ulcers which he had treated by duodenal intubation. The longest time required for healing was six weeks.

Sir William Wheeler said that the good physician would not delay matters by treating medically a case in which medical treatment was likely to prove futile. The general public were largely to blame if they went to an indifferent surgeon or physician.

Dr. WALTER CARR believed that sooner or later all, or almost all, cases of gastric, and certainly all cases of duodenal, ulcer relapsed. A second relapse should always mean surgical interference. The only alternative was for the patient to submit to very severe restrictions for the rest of his life; and his own advice was that it was better to face the comparatively small risks of operation.

Mr. L. N. PYRAH said that in Leeds since 1926 there had been an increase in the medical treatment of ulcer, a decrease in the number of cases of chronic ulcer operated upon, and an increase in the number of perforated ulcers. The number of cases of hæmorrhage admitted to the wards seemed also to have increased considerably.

Dr. J. R. BELL (Melbourne) felt that there had never been enough amicable coöperation between physician and surgeon to secure the best possible results for the patient. He did not agree with those who said gastric ulcer responded better to medical treatment than duodenal ulcer; his experience had been otherwise. He had seen many patients suffering from unpleasant after-effects of gastro-enterostomy.

Mr. W. E. TANNER emphasised the importance of searching for a cause of these conditions, and expressed his belief that ulcers of stomach and duodenum had a microbial origin.

Dr. JACQUES SPIRA said he had shown these ulcers to be due to the action of a direct local irritant on the mucous membrane, and acting on these lines had secured uniformly good results.

The openers having briefly replied,

The CHAIRMAN said the point which needed real insistence was the inefficiency of medical treatment as generally carried out in this country. He was himself strongly in favour of medical measures. His figures showed that of five patients consulting him for surgical treatment, three were referred back to the physicians; though not infrequently some of them came back after medical treatment. Ulcers took a long time to heal; it was essential that patients should rest in bed, with restricted diet, and that the treatment should extend over a considerable time, and he thought that following Prof. H. Maclean's paper surgical aid had been less called for, perforations had increased, and deaths also. As for Dr. Hurst's statement that he had never seen a death from hæmorrhage or perforation while a patient was undergoing medical treatment, he could only reply that he had seen so many that he had lost count of them. Medical treatment was in fact more dangerous than surgical treatment. At the same time he rarely liked to operate until he was satisfied that non-operative treatment had been carried out as thoroughly as possible.

The voting showed the following result: for the motion, 70; against it, 73.

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES

A MEETING of this society was held in London on May 30th with Dr. DAVID NABARRO, the president, in the chair, when a paper on

Venereal Disease in Literature

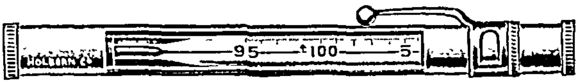
was read by Dr. J. D. ROLLESTON. He pointed out that the value of the allusions made by lay writers in various ages to venereal disease is indicated by the attention given them by numerous medical historians. In spite of statements to the contrary, there is no definite evidence in non-medical literature that syphilis existed in biblical times, classical antiquity, or the Middle Ages. In the sixteenth century the best known lay writers who refer to syphilis are Guicciardini, the historian, Erasmus, and Rabelais. In the Elizabethan age numerous references to syphilis are to be found in Shakespeare and other dramatists of the time. In the eighteenth century the prevalence and severity of syphilis are illustrated in the works of Voltaire, Casanova, Defoe, Fielding, Smollett, Steele, Swift, Gay, and Chesterfield. The belletristic literature of the nineteenth century contains for the first time descriptions of tabes and general paralysis (Heine, Alphonse Daudet, the De Goncourts, Guy de Maupassant, Ibsen, Conan Doyle, and Kipling). The antisyphilitic campaign in the French drama and novel at the beginning of the twentieth century was inspired by Alfred Fournier. Gonorrhœa, of which the first description is in Leviticus, dates from remote antiquity. Owing to its identification with syphilis for about two hundred and fifty years, the terms "clap" and "pox" in non-medical literature are used indiscriminately, the former being sometimes applied to tertiary syphilis and the latter to acute gonorrhœa. Chancroid is probably as old as gonorrhœa and was well known in classical antiquity and the Middle Ages.

A discussion followed in which the PRESIDENT, Sir D'ARCY POWER, Dr. H. J. NORMAN, Dr. PARKES WEBER, and others took part.

NEW INVENTIONS

AN IMPROVED CLINICAL THERMOMETER CASE

I HAVE designed a thermometer case which protects the instrument during the vulnerable periods of its career. Until clinical thermometers can be made so as to be absolutely indestructible, we must put up with breakage due to accidental dropping, though quite a number are broken in the thin case usually provided as a container. Moreover, these cases do not sterilise the thermometer. The container here illustrated is a strong metal tube longitudinally fenestrated, and lined with a Pyrex glass tube (the strongest glass known), the ends of this lining being ground to a watertight fit against washers at each end. The lower end of this tube has a light compression spring-loaded ferrule in which the bulb of the thermometer is held. The screw-cap at the other end presses the thermometer down into the tube and keeps it comfortably housed—in spirit or other antiseptic; a clip, of the fountain-pen type, keeps the case snug in one's pocket. Thus the thermometer is kept safe, sterile, and ready to hand. Owing to atmospheric pressure, when the thermometer has been extracted and the case laid on its side, the fluid does not run out.



The Holborn Surgical Instrument Co., Ltd., of 26, Thavies-inn, London, E.C.1, are the makers.

B. RICHARDSON BILLINGS, M.R.C.S., L.R.C.P. Lond.
Folkestone.

REVIEWS AND NOTICES OF BOOKS

Diabetes Mellitus

By I. M. Rabinowitch, D.Sc., M.D., C.M., F.R.C.P.(C.), Assistant Professor of Medicine and Lecturer in Biochemistry, McGill University; Director, the Department of Metabolism, the Montreal General Hospital. London: Macmillan and Co., Ltd. 1933. Pp. 246. 16*s.*

Dr. Rabinowitch has written this handbook to explain a simplified method of treating diabetes mellitus, and also to describe the high carbohydrate-low fat caloric diet which he has done much to popularise. The first few chapters give a good account of the different types of diabetes and the methods of diagnosis. The description of the action of insulin and of the various manifestations of hypoglycæmia is exceptionally clear. The advantages of the high carbohydrate-low fat caloric diet are then explained. As the amount of carbohydrate is very large, 250 to 300 g., it is unnecessary to weigh the different carbohydrate foods accurately. Dr. Rabinowitch therefore supplies his patients with wooden and paper models. A piece of wood 3½" by 3½" by ½" represents 1 oz. of bread, and one of 1" by 1" by ½" represents ⅓ oz. of butter. Similar models represent the various kinds of protein and fruits consumed. Dr. Rabinowitch always attempts to render the urine free from sugar by diet alone. He uses a ladder diet, starting with one day of starvation. The carbohydrate of the diet is rapidly increased, but the fat ration is very small, being only 50 g. Most of the patients in Montreal do not need insulin, but if sugar does not disappear it is always administered. The dose of insulin is assessed where possible by testing for sugar samples of the urine collected every four or five hours. Estimations of the blood-sugar are made in all cases of difficulty. The diet aimed at is C. 275 g., P. 80 g., and F. 45 g.—calories 1800. The patient is warned repeatedly against the danger of excessive quantities of fat; if, however, they are not content with the small amount of fat allowed, the carbohydrate of the diet is reduced and the fat increased.

The results with this treatment are said to be good, but it seems as ill-balanced as did the old diabetic diet of C. 40 g., F. 250 g.; and the advantages of a low fat régime with a moderately high carbohydrate—say 150 g.—and a moderate amount of fat—say 100 g.—must surely be made more clear before it is justifiable to require patients to submit to such a régime. The influence of any acute infection and also of chronic disease, such as gall-bladder infections, are well explained, and the rules laid down for the care of the feet in elderly people are very sound. But curious errors are made in speaking of the acetone bodies. Acetone is described as present in the urine, whereas Folin showed that this substance is not present in freshly passed urine, occurring only as a result of the decomposition of aceto-acetic acid; beta oxybutyric acid is described as diacetic acid, which is the correct name for aceto-acetic acid. The nitro-prusside test, which is actually more than ten times as sensitive for diacetic acid as it is for acetone, is recommended as a test for acetone, although it is said to be also a test for diacetic acid. Ferric chloride, described here as a test for diacetic acid, is not a sensitive test, and is often negative when the nitro-prusside test is positive, as Dr. Rabinowitch himself points out. Rothera's modification of the nitro-prusside test is not described.

The account of the sugar-tolerance test and the varieties of curves met with is valuable. The incidence of renal glycosuria seems much lower in Canada than in this country.

The book is of interest in that it gives a clear account of an unusual method of treatment. Some years will be needed, however, before it is possible to say whether the diet recommended has any substantial advantages over the more palatable one now in general use.

Röntgentherapie in Tabellenform

By Dr. Emmerich Markovits (from the Roentgen Laboratory of the Krankenhaus Stadt Armenheim in Budapest). Leipzig: Georg Thieme. 1934. Pp. 153. M.10.80.

The tables compiled by Dr. Markovits form an excellent guide to the methods of treatment by deep X ray therapy used in his clinic. The unit of dosage adopted is the biological "skin erythema dose," which the author regards as preferable to the international r unit which he finds in practice to vary greatly with different factors. For malignant disease the "Coutard-Pfahler" method is recommended. However effective this may be, it seems unfortunate that the names of two workers whose ideas are based on different conceptions of the biological response to radiation should be attached to any scheme of treatment.

The remarks on methods and dosage are introductory to a series of tables which include every disease which may be treated by X rays whether deep or superficial. The signs and symptoms, the indications for treatment, the benefits to be anticipated are set out with the technique advised, the possible complications, and the contra-indications. Some of the disorders included would not in this country be subjected to irradiation, but this is more commonly used for chronic infections in continental clinics than it is here, and good results are said to be obtained. The claims made by Dr. Markovits are not extravagant. When discussing the indications for irradiation in several forms of malignant disease he lays it down clearly that surgery is the method of choice, irradiation being considered only as a prophylactic treatment after operation or for inoperable cases. In respect of many conditions, notably ovarian tumours, it is stated that there are no contra-indications to treatment by X rays. Actually the general contra-indications, such as advanced cachexia or acute infection, have previously been noted, but it is misleading to ignore these entirely when specific diseases are under consideration.

On the whole this book represents a successful attempt to compress the fruits of much experience into a form which will allow others to benefit from it. The book ends with some useful plates and figures.

Dermatology and Syphilology

Practical Medicine Series. 1933. By Fred Wise, M.D., and Marion B. Sulzberger, M.D. Chicago: The Year Book Publishers. Pp. 458. $2.25.

This publication contains abstracts from the syphilo-dermatological literature of all countries during 1933. It is essentially a book for the specialist, although the introductory article by the editors on the treatment of acne vulgaris might well lure the general practitioner into the fold of the annual subscriber. There is ample scope for such a volume, for nobody, however voracious a reader, can hope to keep abreast of the literature and memorise even the best of the communications that annually advance these subjects. Some 200 articles and papers are abstracted, and a few lines of editorial comment and criticism are appended to some of them. The process is one which if further expanded would rob the literature of much of its terrors, and absolve the research worker from some tedious preliminary work.

The previous volume—1932—was the first to separate the subject of urology from this series, and the policy should make this issue decidedly more attractive to dermatologists. The table of contents has been enlarged by the addition of the article on acne mentioned above, a section on physical therapy, and another containing some interesting "experimental and investigative studies" among which German authors are overwhelmingly represented, Great Britain by only one, and France by none at all. A further addition is a supplementary bibliography with full references of some 180 contributions, American, German, Norwegian, and Italian, not considered quite worthy of abstraction for the purposes of this volume. French and British authors are again in the minority.

There can be no doubt at all that the idea of grouping the best publications and abstracting them annually in this way has much to commend it, not only because of the facilities afforded to busy workers who want to keep up to date, but also to save deserving authors from relative oblivion.

Combined Text-book of Obstetrics and Gynæcology

Second edition, revised, rewritten, and enlarged. By J. M. MUNRO KERR, M.D., F.R.F.P. & S. Glasg., J. HAIG FERGUSON, M.D., F.R.C.S. Edin., JAMES YOUNG, D.S.O., M.D., F.R.C.S. Edin., and JAMES HENDRY, M.B.E., B.Sc., M.B., F.R.C.P. & S. Glasg. Edinburgh: E. and S. Livingstone. 1933. Pp. 1100. 35s.

THE greater part of this text-book is devoted to obstetrics, of which a well-balanced account is given, in sufficient detail for the student. The second edition has been thoroughly revised and brought up to date. The chapters on toxæmias of pregnancy and puerperal sepsis are excellent, and an interesting final section on the causes and factors influencing puerperal mortality is included. Intercurrent diseases are discussed fully, and Prof. Charles McNeil contributes a useful chapter on "The Infant in the First Month."

Undue prominence is given to Schultze's and Byrd's methods of artificial respiration in the new-born; the illustrations of the first might have been omitted, since the authors themselves state that it is not now favoured, and recommend less violent measures. We regret to see the illustration of management of the perineum by the "British method" appear once more. The control of the head with the left hand passed from above between the mother's thighs would involve extreme discomfort for the obstetrician in prolonged delivery, and danger of sepsis for the patient. The short paragraph on septic abortion, a subject of great and increasing importance, is inadequate and gives no guidance in treatment. Otherwise, the obstetric section is well written and highly informative.

Gynæcology is treated more shortly. We have detected no omissions; the theories about the production of endometrioma are discussed, and rare conditions such as granulosa-cell tumours and Krukenberg tumours are described and figured. Mention might have been made of the importance of the Aschheim-Zondek reaction in the diagnosis of chorion-epithelioma. The relatively small space given to gynæcology necessarily curtails the amount of detail in the book.

Descriptions are given of all the important obstetric and gynæcological operations, with a final short chapter on radiology by Dr. J. Duncan White. The work is well illustrated by some 500 drawings and photographs.

Obstetrícia Operatória

By RAUL BRIQUET, Professor of Clinical Obstetrics in the Medical Faculty of São Paulo. São Paulo: Companhia Editora Nacional. Pp. 540.

THIS book, intended for students and practitioners of midwifery, is clearly written. The marginal headings, and the system of arranging the different operations in numbered steps, facilitates rapid reference. The illustrations, many of which are borrowed from well-known text-books, are good. The chapters on maternal and fœtal traumata, and on the indications and contra-indications to operation, are particularly useful. Certain omissions are noticeable—e.g., no mention is made of axis-traction forceps or of glycerin drainage. The chapter on anæsthesia contains 38 pages devoted to spinal anæsthesia, and only two on inhalation methods, under which heading only chloroform and ether are discussed; and gas-and-oxygen is not mentioned. In the description of the technique of blood transfusion no account is given of the preliminary grouping of the bloods, and the necessity for this is not explained. The book is marred by inaccuracies, of which a proportion only is included in a list of errata. Foreign words, in particular, are often misspelt. These errors render the book troublesome to read and diminish its value.

Practitioner's Library of Medicine and Surgery

Vol. VI. *Obstetrics and Gynæcology.* Associate Editor: LUTHER K. MUSSELMAN, B.S., Ph.D., M.D., Associate Clinical Professor of Obstetrics and Gynæcology, Yale University School of Medicine. London: D. Appleton-Century Company. 1934. Pp. 900. 50s.

THIS volume is the outcome of the collaboration of 14 teachers who have each written a monograph on one aspect of midwifery or gynæcology: 560 pages are devoted to midwifery, 278 to gynæcology, and 58 to the index. The preface states that the book is intended for the use of the man in general practice, and this doubtless accounts for the fairly extensive clinical review of obstetric symptomatology and treatment, and for the compression of the gynæcological matter into small space.

The work appears to reflect clearly the present-day practice of midwifery and gynæcology in the United States of America. On the whole the practice recommended is that in common use in this country, but in a few places the teaching would be unacceptable here. Under the heading of toxæmia of pregnancy Dr. Musselman gives a good clinical picture of the various manifestations of this condition. He reviews the usual methods of treatment of eclampsia and pre-eclampsia, and points out the good results of expectant treatment as against the poor results of accouchement forcé. At the conclusion he recommends the practitioner always to adopt expectant treatment as giving the best results for both mother and baby, while admitting that in a good hospital a specialist will get excellent results from emptying the uterus immediately after the first eclamptic fit. Under the heading of pathological pregnancy are grouped many complicating conditions. Here we notice a certain inclination to advise the woman suffering from defects to put up with them rather than to seek treatment during pregnancy. For example, in gonorrhœal infection of the cervix local treatment is not advised, and even if the condition is accompanied by cervical erosion or warts of the vulva the main emphasis seems to be laid on the instillation of silver nitrate drops into the infant's eyes after birth to avoid the consequences of neglect of treatment of the mother. Each section is supplied with full references, and a good subject index is supplied.

1. Adam's Ancestors

By L. S. B. Leakey, M.A., Ph.D. London: Methuen and Co., Ltd. 1934. Pp. 244. 7*s.* 6*d.*

2. This Progress: The Tragedy of Evolution

By Bernard Acworth. London: Rich and Cowan. 1934. Pp. 334. 7*s.* 6*d.*

1. Dr. Leakey became famous two or three years ago by his discovery in Tanganyika of the remains of a very primeval man fairly similar to modern *Homo sapiens* and probably in his direct line of descent. In this book he gives a clear and readable discussion of man's immediate ancestry and of the various kinds of men—e.g., *Palæoanthropus neanderthalensis*—which have disappeared. Our knowledge of them comes as much from the remains of their cultures as from their own bones, and a large part of the book is taken up with the description and classification of their imperishable stone implements. Modern research has gone a long way since we knew of nothing but palæoliths and neoliths, and Dr. Leakey's functional tests of these old tools are particularly impressive; he tells us, for instance, that in Africa he skinned and cut up a gazelle in 20 minutes with a tool about 25,000 years old and less than 2 inches long. He also describes from his own experiments how the various implements may be made. It is a good book and cheap, and it should be widely read.

2. Mr. Acworth knows so little of evolution that he regards it as inconsistent with Christianity, and so little of Christianity that he finds it irreconcilable with evolution. In this schoolboy dilemma he, wisely enough perhaps, chooses Christianity, and says that "the theory of evolution is a faith founded in atheism, leading its adherents to nihilism" and much more of the same sort.

Diagnostics Urgents—Abdomen

Second edition. By H. Mondor, Professeur agrégé à la Faculté de Paris; Chirurgien de l'Hôpital Bichat. Paris: Masson et Cie. 1933. 2 vols. Pp. 1064. Fr.125.

This treatise is concerned solely with acute abdominal diseases of such a nature that, if surgery be refused, the patients die in a few hours or days. Surgeons will find it of absorbing interest. Every conceivable emergency is considered fully and very clear accounts are given of signs and symptoms. The author's method is to give a general description and then to drive home the lessons he wants to instil by the clinical notes of actual cases. Not all of them are personal ones; several are from classical sources. Prof. Mondor takes no narrow view of his subject. He has searched widely in the literature of this branch of surgery and gives authority for all his statements.

The general make-up of the book and the illustrations reach a high standard. There is perhaps a little unnecessary reiteration, but this at least serves to emphasise the truth of the teaching that the author wishes to drive home. The book represents a store of knowledge of the syndromes of acute surgical abdominal disease.

EUGENICS IN PRACTICE

A Series of Essays suggested by the Report of the Brock Committee

V.—SEGREGATION OR STERILISATION?

The reduction of those physical and mental infirmities which are commonly regarded as hereditary can be viewed from different angles by the biologist and the administrator. To the biologist, the problem presents itself in panoramic simplicity as a racial problem. The national birth-rate, he observes, is falling and we are within measurable distance of reaching a stationary or even a declining population. He notes the phenomenon of the differential birth-rate and the fact that the poorest and socially most submerged fraction of the population has the highest fertility and will therefore contribute to the next generation a fraction larger than that which it now constitutes. To the biologist, sterilisation commends itself as a simple, logical, medically feasible, and humanitarian measure whose racial effects can be made to resemble those which, in the past, were more brutally achieved by natural selection. The measure appears to him no less applicable to those mental defectives who owe their infirmity to heredity than to other victims of morbid inheritance.

The administrator, however, sees the problem from a very different angle. Less concerned with biological than with social considerations, he is responsible for the care and protection of individual mental defectives. He is keenly aware that the institutional provision at present available for these is, in many areas, lamentably inadequate. He recognises that the approved sterilising operations leave the defective's antisocial proclivities wholly unchanged and that if a defective stole, committed sexual offences, or made a nuisance of himself before sterilisation, he would continue to do so afterwards. Improved ascertainment and an amplifying of existing institutional accommodation are for him the first requirements to be satisfied. What compromise, if any, can be reached between these two views?

SEGREGATION HAS NEVER BEEN PROPERLY TRIED

The facts of the matter are as follows: according to the annual report of the Board of Control for 1932, some 35,000 mental defectives are in institutions under the Mental Deficiency Acts. The total number of mental defectives in England and Wales has been estimated by the Wood Committee as 300,000. This committee has further recommended that institutional provision be made for 100,000, or one-third of this total. The committee further advocated what they termed a "new conception" of the function of the institution and the colony for mental defectives. These should no longer be regarded as permanent residences for mental defectives but rather as training schools, wherein the most would be made of their limited capacities and aptitudes with a view to equipping them to live useful lives under supervision in the general community. The institution, according to a simile employed by the Wood Committee, should be regarded, not as a stagnant pool, but as a flowing lake, through which should pass a stream of defectives who would be stabilised, trained, and subsequently placed in the general community. Like sterilisation, this conception was first put into practice in America, particularly in the work of Fernald to whom we owe the conception of the institution as a socialising force.

That the principle of sterilisation can be usefully adapted to this view was recognised as early as 1929 in the Annual Report for 1928 of the Board of Control which contains the following passage:

> "Roughly speaking, out of 300,000 mental defectives in England and Wales, one-third will require institutional provision and two-thirds some form of community care, that is, care outside an institution. It is in the case of the latter that the risk of procreation arises and the case for sterilisation, if such a case exists at all, is strongest."

This view has been adopted by the Brock Committee which has recommended the creation of legal facilities for the voluntary sterilisation, subject to appropriate safeguards, of certain mental defectives. The measure, however, is clearly limited to those defectives who, apart from the risk of their procreation, are fitted for life in the general community. That is to say, it is wholly unsuited to those mental defectives who have antisocial tendencies which could not be controlled under the conditions of supervision or guardianship which have been specified in the Mental Deficiency Act.

SAFEGUARDS

There is then no antithesis between segregation and sterilisation. Each is necessarily incomplete and ineffective without the other. Segregation alone has never been applied to the extent of making it eugenically effective, nor could it be so applied without such expense as even an enlightened public opinion might hesitate to incur. But sterilisation would also fail of its purpose unless combined with a far larger and more intelligent use of segregation than is at present the case. As safeguards against abuses and misuses the Brock Committee suggest that an application for sterilisation should be supported by two medical practitioners, one of whom should, if possible, be the patient's family doctor and the other a practitioner on a list approved by the Minister of Health. In all cases in which the patient is capable of giving consent he should sign a declaration of willingness to be sterilised, and one of the two medical recommendations should include a statement that the effect of the operation has been explained to the patient and that, in the medical practitioner's opinion, he is capable of understanding it. If the practitioner is not satisfied that the patient is competent to give a reasonable consent, the full consent and understanding of the parent or guardian should be obtained, and if the applicant is married, he or she should be required to notify the spouse of the application.

It would be undesirable as a general principle to make discharge from an institution conditional upon sterilisation; for apart from being a form of "veiled coercion," this would make it possible for the parent or guardian, by refusing consent to sterilisation, to keep a defective permanently in an institution.

Provided then that sterilisation is used with discrimination and is not forced upon the defective or his relatives against their inclinations and scruples, it can clearly be used as an auxiliary to segregation in such a way as not to interfere with the fulfilment of the recommendations of the Wood Committee relating to the creation of increased facilities for segregation.

THE QUESTION OF COMPULSION

"What is the use," it is sometimes asked, "of limiting proposals for eugenic sterilisation to voluntary measures? These will never be adopted by the very people whose fertility we are most anxious to restrict. Such are incapable of using contraception, still less sexual abstinence. The only way to deal with real slum types in any big town is to sterilise them willy-nilly." This argument has been increasingly heard since the publication of the Brock report. Though the German Sterilisation Act has only been in force since the beginning of the present year some information about its workings is already available. Nine conditions are specified which justify voluntary or compulsory sterilisation. These include schizophrenia and manic-depressive insanity, disorders which, along with seven other morbid conditions, are notifiable much as are certain infectious diseases in this country. A person in whom a diagnosis of any of these nine conditions has been made becomes a potential candidate for voluntary or compulsory sterilisation.

But the diagnosis of mental disorders is not as simple and straightforward a business as the diagnosis of most common physical ailments; both the standard and the terminology employed by psychiatrists differ in different countries and even in the same country. Since the passing of the Sterilisation Act it has been noticed that German doctors hesitate to diagnose schizophrenia and manic-depressive insanity, preferring to use other and less compromising diagnostic labels. People are beginning to be afraid of entering public institutions for the treatment of mental disorder, wherein they may be compulsorily sterilised before discharge; and they are inclined to conceal important elements of their pedigrees which might substantiate these diagnoses. If this goes on it will put an end to any open inquiry into the genetics of mental disorder which, above all things, depends on the submission of accurate pedigrees. More important than all this in the life of the community is the fact that the use of sterilisation as a compulsory measure will inevitably cause a stigma to be attached to the operation in exactly the way that would happen if it were used as a weapon for punishing crime. An individual would have to exhibit very undesirable characteristics to be compulsorily sterilised; and if such a measure became law people would hesitate before coming forward voluntarily for sterilisation, lest they be tarred with the same brush. The German propaganda is distinguishing with great care between the eugenic and the punitive.

It has moreover been found, in those States in America where voluntary and compulsory clauses exist, that superintendents of institutions will not incur the unpleasantness of applying compulsion unless they are supported by public feeling. But where a favourable public feeling exists, people will avail themselves of sterilisation voluntarily. Where the measure lacks public support no one gets sterilised, even if compulsory clauses are in force; where public support for sterilisation is forthcoming compulsory clauses are unnecessary. It can therefore be said that though occasional cases can undoubtedly be found to which compulsion appears applicable, the advantages of formulating coercive clauses to meet them are entirely outweighed by the accompanying disadvantages.

THE LANCET

LONDON: SATURDAY, JUNE 9, 1934

SCHOOL EPIDEMICS

It is not easy for the school medical officer to handle the problem of infectious disease in a way that will please everyone. Caution in his methods of isolation leads the parent to complain that his money and the child's time are being wasted; laxity lays him open to censure. The old-fashioned parent seemed content to look upon the public school as a place where the character and physique of his children were hardened and prepared for the larger world. The weakest went to the wall and the survivors emerged morally and physically "salted." The parent of to-day expects a large measure of individual care, both as regards mind and body, to be given, and unflagging efforts are made by school-masters, medical officers, and others to provide this care. Nor is the effort restricted to individual schools and their officers. The modern school doctor exchanges frequent notes with his colleagues elsewhere on matters of school hygiene. For some years past the Medical Research Council have had a special committee for the investigation of school epidemics; 30 large public schools coöperate in keeping this committee continuously informed of what is happening in the schools. Already valuable information has been acquired. Special laboratory investigations have been carried out using the material provided by those schools. Among the more important results have been those submitted by J. A. Glover and F. Griffith on streptococcal infections in schools. Much light has been shed on the spread of conditions due to infection with hæmolytic streptococci; the cumulative effect of nasopharyngeal epidemics is recognised, and that an epidemic of colds may lead to an outbreak of sore-throat, which in its turn may give rise to otitis or mastoiditis. An epidemic of scarlet fever may be concealed in such apparently modest manifestations.

There is instruction to be gained from contrasting girls' schools with boys'. As compared with boys, girls have had less than half the incidence of otitis media and pneumonia, and only one-eighth the incidence of sinusitis. This may be ascribed in part to the greater care and supervision which girls receive, but is probably more closely connected with the better sleeping accommodation at the girls' schools. Most modern observers have emphasised the importance of dormitories as breeding grounds for epidemics. There is little doubt that better dormitory conditions and less overcrowding would improve the hygienic reputation of some of our public schools. In this direction, at least, the schools themselves have an ample field for effort, and it is but fair to say that most of them are doing as much as their finances allow.

One of the outstanding things in modern school hygiene has been the success of the preparatory schools in achieving perfect health conditions. The public schools might well complain that the efforts and precautions of many of the preparatory schools have been too successful. Boys and girls go on to the big schools in a state of epidemiological innocence and with little preparation for guerilla warfare with microbial infection. The public schools have thus to bear the brunt not only of epidemics of their own age-group but of others which, if they must be faced, might well have been faced earlier. It is not uncommon for a boy or girl to catch measles, whooping-cough, and scarlet fever in addition to minor infectious complaints during the three or four years at public school, and even if the scholar passes through these without giving personal cause for anxiety the parent may become restive at the loss of school time due to the interference in routine which must accompany epidemics. Artificial immunisation has little to offer. Its modern triumph is against diphtheria, a disease rarely met with in better class schools. The public hears vaguely that scarlet fever and measles can now be prevented or aborted, and though this is true it would be well-nigh impossible to apply the new methods to school life. The only solution of general application is the one attempted in all well-managed schools—to keep the individual boy or girl in the best possible state of health and to make every effort to prevent threatened epidemics from gathering headway. Infection being accepted as inevitable, the child encounters it in the best possible position to overcome it with his own defences. We hope it may not be taken as a counsel of despair if we suggest that until the study of infection has reached a more advanced stage it would be well for the parent (even if he is a doctor) to look upon the public schools, with his grandfather's eyes, as a place where a boy can learn to make his first trials against the struggles and hardships of life, not forgetting that this applies as much to the attacks of microbes as to the chastenings of his fellows.

PERIPHERAL VASCULAR DISEASE

The relief which surgery can afford in certain disorders of the peripheral blood-vessels has aroused a growing interest in the selection of cases suitable for operation, and consequently in the pathology of arterial obstruction. The study of patients showing the various manifestations of peripheral vascular disease has exposed our lack of knowledge of the processes which bring about changes in colour, temperature, and sensation in the affected extremities, and the need to develop methods of investigation which besides giving reliable information with regard to the state of the arteries, arterioles, and capillaries, will also indicate the value of various forms of treatment. Steps in this direction are being made in centres of clinical research in this country and in the United States, and workers in the vascular disease clinics established respectively in Chicago and in Cincinnati have recently described their routine methods of examining patients.

G. De Takats and W. D. Mackenzie, of Chicago, lay particular stress[1] on the value of the tests in determining the lowest level at which amputation may be performed with a good prospect of sound healing, but the tabulated notes of cases of organic and spasmodic vascular disorders indicate how often amputation may be avoided by carefully planned physiotherapy, exercises and other measures, such as protein shock, designed to encourage the peripheral circulation. In every case a note is made of the volume of the pulse in the main vessels of all four extremities; the surface temperature is registered at several points, and the elasticity of the main vessels is tested by means of the Pachon oscillometer. These tests provide information about the condition of the arteries; the smaller vessels being examined by observing the variations in the colour of the skin as the result of changes in posture, and also by the cutaneous reaction to the injection of a small quantity of histamine acid phosphate. X ray examinations for calcareous degeneration and also after injection of iopax, skiodan, or thorotrast are made in every case, and among the investigations to be carried out only under special circumstances is mentioned excision of a short portion of one of the smaller arteries for histological examination. This may seem a drastic procedure in a limb already suffering from the effects of arterial damage, but it is essential that the details of the morbid processes in the vessel walls should be ascertained in order to correlate the clinical findings with the true pathology, and there is evidence that excision of a portion of a diseased artery may not be as harmful as it sounds, and may in fact be beneficial.

The keynote of the communication by M. R. Reid,[2] of Cincinnati, is the conservative treatment of the complications of vascular disease, and especially the alternatives to amputation for gangrene. From an intensive study of his clinical material he concludes that arteries may become occluded by a gradual process without any noticeable change in the tissues supplied by them, but that when a limb in such a critical condition is exposed to cold, is attacked by infection, or has another of its arteries occluded *suddenly* by embolism or thrombosis, gangrene is extremely likely to supervene. He believes that the difference between gradual and sudden occlusion of the arteries is to be explained by the element of vasospasm accompanying sudden blockage, and he devotes the greater part of his paper to the consideration of various measures which may be adopted to tide the patient over the critical period immediately after the occurrence of the block and until the supply of blood can be readjusted to the demands of the tissues for it. In addition to good nursing, care of the skin, application of warmth, attention to the posture of the limb, and administration of large quantities of fluid, Reid advocates a new piece of apparatus designed with the same object, that of improving the peripheral circulation in sclerotic arteries so as to avoid amputation. It consists of a chamber shaped like a large boot which surrounds the limb, and is connected to a motor-driven pump capable of producing alternating positive and negative pressures within it. The leg is treated in a slightly elevated position, and the machine is set so as to produce a negative pressure of 80 mm. Hg alternating with a positive pressure of 20 mm. Hg, the duration of a complete cycle being about 30 seconds, and a single treatment lasting on the average about 20 minutes. The machine is sold under the name of the Pavaex Treatment Unit, Pavaex being a portmanteau word for passive vascular exercises. The value of this apparatus is established by the results obtained in 69 patients, all with advanced arterial disease, and many showing the premonitory signs of gangrene or even fully developed gangrene of one or more digits. The most noticeable effect, which occurred in every patient, was that the surface temperature of the limb rose and remained up for several hours after the treatment. When treatments were repeated at frequent intervals it was possible to maintain this rise of temperature indefinitely, and as the effect is due presumably to increase of collateral circulation, the relief of pain and the improvement in the nutrition of the limb which accompany it are readily accounted for.

The reference to spasm in the distal vessels as a result of embolism or thrombosis of an artery recalls the work of R. Leriche and P. Stricker,[3] who have recorded great improvement in the peripheral circulation following excision of the occluded segment of the artery. They explain this remarkable observation by supposing that the inflammatory changes in the vessel wall at the site of occlusion stimulate the sympathetic nerves in the tunica adventitia, thus causing peripheral vasoconstriction. This explanation revives the hardy controversy about the justification for peri-arterial sympathectomy, and though anatomists still have nothing to say in its favour there are many surgeons, prominent among them being Prof. Archibald Young, whose confidence in the operation remains unshaken. Prof. Young, in an account[4] of his own experience of peri-arterial sympathectomy in the treatment of a large number of circulatory disorders, concludes that its value has been proved clinically, and that "it is for the anatomist and the physiologist to explain the results on whatever basis they choose." Prof. Young supplies also an interesting account of the manner in which our knowledge of the nervous control of the blood-vessels has gradually been built up, and refers to a little-known series of experiments carried out by Lister in 1857 which can be recognised as a natural prelude to the work of Gaskell, Langley, and Bayliss. The interest of surgeons in the problems of vascular disease is more intense now than it has ever been before, and there is reason to hope that, given clinical methods of investigation accurate enough to indicate the value of various methods of treatment, surgery may again prove a powerful instrument of research.

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[1] De Takats, G., and Mackenzie, W. D.: Surg., Gyn., and Obst., 1934, lviii., 655.

[2] Reid, M. R.: Amer. Jour. Surg., 1934, xxiv., 12.

[3] L'arteriectomie dans les arterites obliterantes, Paris, 1933.

[4] Glasgow Med. Jour., 1931, cxv., 273.

PROGRESS IN PSYCHIATRY

A REVIEW of any one disorder tends to incorporate much of the history of similar conditions, and Dr. A. J. LEWIS, in his recent review of melancholia [1] accuses himself of writing something like a history of psychiatry. By such a fault, if it be one, psychiatrists are so much the richer. It would be impossible, however, not to have made this welcome mistake seeing that the affective disorders have only been clearly differentiated from the schizophrenic psychoses within the last hundred years. Vogel (1724–74) classified *morbi mentis* into six: mania, melancholia, fatuitas, stupiditas amentia, and oblivio. In 1849 in his Croonian lectures John Conolly of Hanwell, the champion of "no restraint," could still describe mania and melancholia as the two chief types of mental disorder; but he saw that stupor and apathy, of a type now regarded as schizophrenic, were definitely of another order. To-day the discussion whether psychotic depressions and neurotic depressions can be separated still continues, though Dr. Lewis himself shows that he believes attempts at rigid segregation may defeat scientific accuracy.

The cleavage between those who have attempted to explain or classify mental disease, and those who have aimed at giving accurate clinical descriptions, is clearly seen in Dr. Lewis's review. The German school are typical of the former, Esquirol preeminent in the latter; while Maudsley occupies a distinguished position midway. There have been endless theories, from those of Hippocrates, who divided mental disorders into four (mania, melancholia, paranoia, and phrenitis), and Galen, with his emphasis on a superfluity of black bile in melancholia, down to the present day. Riverius, of Montpellier, in the sixteenth century insisted on a proximate cause, a poison generated in the body, which can be taken up and developed best in the "atrabiliar constitution," and thus preceded those who at the present time seek in the disorder for some fundamental biochemical abnormality. John Brown in the eighteenth century, viewing insanity as a disease not of a single part but of the whole body, was in a sense the father of modern theories. Paracelsus (1658) and van Helmont (1707) suggested that melancholia springs from anger and fright and that these arise in some way from the stomach—a view which recalls Stransky's unconfirmed theory of 20 years ago that the vegetative nervous system and the endocrines are largely responsible for the condition. English physicians before Pinel were accused by him of confusing the issue by their theories—a taunt which can hardly be levelled at the German school led by Griesinger. This school produced Kahlbaum, who showed how the morbid affect could account for all the mental signs in melancholia but not for those in primary dementia (dementia præcox), and Kraepelin, who built the theories of others into the most stable elements of modern classifications. The French school is notable for Pinel, who was the first pleader for more humane treatment of the insane; Esquirol, who combined interesting theories with a genius for clinical observation; Falret, who first described *folie circulaire* in 1855, and whose influence on Kraepelin, Dr. Lewis says, "may be safely assumed"; and Morel and his successors, who first drew attention to constitutional and inherited factors, and must thus be placed, chronologically, before Kretschmer. Finally, tribute is paid to Adolf Meyer, whose emphasis upon the psychobiological individual reactions has influenced psychiatrists' conceptions profoundly. Bonhoeffer's description of exogenous types of reaction belongs to the present century, as do the theories of the psycho-analytical school.

Dr. Lewis reminds us that his exhaustive and illuminating survey hardly deals with therapy. The history of mental disorder has been marked by the efforts of the exorcisers and believers in witch-magic—a fact which was only poorly concealed by our ancestors in the medical art. Thus to quote again regarding Brown: his theories led him to attempt to excite the opposite emotions in his patients, and the depressed melancholics were subjected to the cruellest alarms. Avicenna, in the eleventh century, was the father of the whirling chair. Electricity was used in the eighteenth century, and warm baths for mania and cold baths for melancholia were advised at the same time. It is interesting to note that Pargeter, in the same century, recommended snuff, on the assumption that it aids the removal of lymph from the upper respiratory tract, and that the sneezing stimulates the nervous system. Dr. Lewis omits any discussion of the "humane" aspects of treatment, but these have been fully and frequently considered elsewhere.

THE BIRTHDAY HONOURS

ON page 1256 will be found the names of the members of the medical profession who have received honours on the occasion of the King's birthday, but in addition to those who have a place on the Medical Register there are others in the list whose work has been discharged either in close alliance with medicine or in fields where their activities make for the promotion of medicine. Everyone will recognise among these as one deserving of public honour Miss A. F. Lloyd Still, whose services alike as president of the International Council of Nurses and matron of St. Thomas's Hospital have been of high importance. Miss Lloyd Still becomes D.B.E. Among the new knight bachelors will be found Captain Ian Fraser, M.P., chairman of the Executive Council of St. Dunstan's, whose zealous activity on behalf of the blind commands admiration. Miss Nancy Stephen, in connexion with the Red Cross Society, has laboured for blinded ex-soldiers in the Commonwealth of Australia and receives the O.B.E., and the same distinction falls to Miss Ethel Rose Collins, R.R.C., principal matron, Queen Alexandra's Imperial Military Nursing Service. The M.B.E. has been awarded to Mr. Norman Casey, superintendent of prisons in Fiji, and Mr. Alfred Nicholls, superintendent of police and prisons at St. Helena. Mrs. Ann Maria Greenwood, matron at the British Military Families Hospital, Hyderabad, receives the M.B.E., as also do Miss Sarah Jane Lambert, R.R.C., county nursing superintendent and inspector of midwives, Isle of Wight, and Miss Mabel Elsie Wolff, inspector of midwives, Sudan. The Kaisar-i-Hind Gold Medal has been awarded to Miss Lena Benjamin, superintendent of the American Baptist Mission Hospital, Madras; and to Mrs. Jeenabai Duggan, of Bombay. To all the medical men and women in the honours list, and equally to those whose coöperation in their work has been signalled out, we offer congratulations.

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[1] Jour. Ment. Sci., 1934, lxxx., 1.

G. De Takats and W. D. Mackenzie, of Chicago, lay particular stress [1] on the value of the tests in determining the lowest level at which amputation may be performed with a good prospect of sound healing, but the tabulated notes of cases of organic and spasmodic vascular disorders indicate how often amputation may be avoided by carefully planned physiotherapy, exercises and other measures, such as protein shock, designed to encourage the peripheral circulation. In every case a note is made of the volume of the pulse in the main vessels of all four extremities; the surface temperature is registered at several points, and the elasticity of the main vessels is tested by means of the Pachon oscillometer. These tests provide information about the condition of the arteries; the smaller vessels being examined by observing the variations in the colour of the skin as the result of changes in posture, and also by the cutaneous reaction to the injection of a small quantity of histamine acid phosphate. X ray examinations for calcareous degeneration and also after injection of iopax, skiodan, or thorotrast are made in every case, and among the investigations to be carried out only under special circumstances is mentioned excision of a short portion of one of the smaller arteries for histological examination. This may seem a drastic procedure in a limb already suffering from the effects of arterial damage, but it is essential that the details of the morbid processes in the vessel walls should be ascertained in order to correlate the clinical findings with the true pathology, and there is evidence that excision of a portion of a diseased artery may not be as harmful as it sounds, and may in fact be beneficial.

The keynote of the communication by M. R. Reid,[2] of Cincinnati, is the conservative treatment of the complications of vascular disease, and especially the alternatives to amputation for gangrene. From an intensive study of his clinical material he concludes that arteries may become occluded by a gradual process without any noticeable change in the tissues supplied by them, but that when a limb in such a critical condition is exposed to cold, is attacked by infection, or has another of its arteries occluded *suddenly* by embolism or thrombosis, gangrene is extremely likely to supervene. He believes that the difference between gradual and sudden occlusion of the arteries is to be explained by the element of vasospasm accompanying sudden blockage, and he devotes the greater part of his paper to the consideration of various measures which may be adopted to tide the patient over the critical period immediately after the occurrence of the block and until the supply of blood can be readjusted to the demands of the tissues for it. In addition to good nursing, care of the skin, application of warmth, attention to the posture of the limb, and administration of large quantities of fluid, Reid advocates a new piece of apparatus designed with the same object, that of improving the peripheral circulation in sclerotic arteries so as to avoid amputation. It consists of a chamber shaped like a large boot which surrounds the limb, and is connected to a motor-driven pump capable of producing alternating positive and negative pressures within it. The leg is treated in a slightly elevated position, and the machine is set so as to produce a negative pressure of 80 mm. Hg alternating with a positive pressure of 20 mm. Hg, the duration of a complete cycle being about 30 seconds, and a single treatment lasting on the average about 20 minutes. The machine is sold under the name of the Pavaex Treatment Unit, Pavaex being a portmanteau word for passive vascular exercises. The value of this apparatus is established by the results obtained in 69 patients, all with advanced arterial disease, and many showing the premonitory signs of gangrene or even fully developed gangrene of one or more digits. The most noticeable effect, which occurred in every patient, was that the surface temperature of the limb rose and remained up for several hours after the treatment. When treatments were repeated at frequent intervals it was possible to maintain this rise of temperature indefinitely, and as the effect is due presumably to increase of collateral circulation, the relief of pain and the improvement in the nutrition of the limb which accompany it are readily accounted for.

The reference to spasm in the distal vessels as a result of embolism or thrombosis of an artery recalls the work of R. Leriche and P. Stricker,[3] who have recorded great improvement in the peripheral circulation following excision of the occluded segment of the artery. They explain this remarkable observation by supposing that the inflammatory changes in the vessel wall at the site of occlusion stimulate the sympathetic nerves in the tunica adventitia, thus causing peripheral vasoconstriction. This explanation revives the hardy controversy about the justification for peri-arterial sympathectomy, and though anatomists still have nothing to say in its favour there are many surgeons, prominent among them being Prof. Archibald Young, whose confidence in the operation remains unshaken. Prof. Young, in an account [4] of his own experience of peri-arterial sympathectomy in the treatment of a large number of circulatory disorders, concludes that its value has been proved clinically, and that "it is for the anatomist and the physiologist to explain the results on whatever basis they choose." Prof. Young supplies also an interesting account of the manner in which our knowledge of the nervous control of the blood-vessels has gradually been built up, and refers to a little-known series of experiments carried out by Lister in 1857 which can be recognised as a natural prelude to the work of Gaskell, Langley, and Bayliss. The interest of surgeons in the problems of vascular disease is more intense now than it has ever been before, and there is reason to hope that, given clinical methods of investigation accurate enough to indicate the value of various methods of treatment, surgery may again prove a powerful instrument of research.

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[1] De Takats, G., and Mackenzie, W. D.: Surg., Gyn., and Obst., 1934, lviii., 655.

[2] Reid, M. R.: Amer. Jour. Surg., 1934, xxiv., 12.

[3] L'arteriectomie dans les arterites oblitérantes, Paris, 1933.

[4] Glasgow Med. Jour., 1931, cxv., 273.

PROGRESS IN PSYCHIATRY

A REVIEW of any one disorder tends to incorporate much of the history of similar conditions, and Dr. A. J. LEWIS, in his recent review of melancholia[1] accuses himself of writing something like a history of psychiatry. By such a fault, if it be one, psychiatrists are so much the richer. It would be impossible, however, not to have made this welcome mistake seeing that the affective disorders have only been clearly differentiated from the schizophrenic psychoses within the last hundred years. Vogel (1724–74) classified *morbi mentis* into six: mania, melancholia, fatuitas, stupiditas amentia, and oblivio. In 1849 in his Croonian lectures John Conolly of Hanwell, the champion of "no restraint," could still describe mania and melancholia as the two chief types of mental disorder; but he saw that stupor and apathy, of a type now regarded as schizophrenic, were definitely of another order. To-day the discussion whether psychotic depressions and neurotic depressions can be separated still continues, though Dr. Lewis himself shows that he believes attempts at rigid segregation may defeat scientific accuracy.

The cleavage between those who have attempted to explain or classify mental disease, and those who have aimed at giving accurate clinical descriptions, is clearly seen in Dr. Lewis's review. The German school are typical of the former, Esquirol pre-eminent in the latter; while Maudsley occupies a distinguished position midway. There have been endless theories, from those of Hippocrates, who divided mental disorders into four (mania, melancholia, paranoia, and phrenitis), and Galen, with his emphasis on a superfluity of black bile in melancholia, down to the present day. Riverius, of Montpellier, in the sixteenth century insisted on a proximate cause, a poison generated in the body, which can be taken up and developed best in the "atrabiliar constitution," and thus preceded those who at the present time seek in the disorder for some fundamental biochemical abnormality. John Brown in the eighteenth century, viewing insanity as a disease not of a single part but of the whole body, was in a sense the father of modern theories. Paracelsus (1658) and van Helmont (1707) suggested that melancholia springs from anger and fright and that these arise in some way from the stomach—a view which recalls Stransky's unconfirmed theory of 20 years ago that the vegetative nervous system and the endocrines are largely responsible for the condition. English physicians before Pinel were accused by him of confusing the issue by their theories—a taunt which can hardly be levelled at the German school led by Griesinger. This school produced Kahlbaum, who showed how the morbid affect could account for all the mental signs in melancholia but not for those in primary dementia (dementia præcox), and Kraepelin, who built the theories of others into the most stable elements of modern classifications. The French school is notable for Pinel, who was the first pleader for more humane treatment of the insane; Esquirol, who combined interesting theories with a genius for clinical observation; Falret, who first described *folie circulaire* in 1855, and whose influence on Kraepelin, Dr. Lewis says, "may be safely assumed"; and Morel and his successors, who first drew attention to constitutional and inherited factors, and must thus be placed, chronologically, before Kretschmer. Finally, tribute is paid to Adolf Meyer, whose emphasis upon the psychobiological individual reactions has influenced psychiatrists' conceptions profoundly. Bonhoeffer's description of exogenous types of reaction belongs to the present century, as do the theories of the psycho-analytical school.

Dr. Lewis reminds us that his exhaustive and illuminating survey hardly deals with therapy. The history of mental disorder has been marked by the efforts of the exorcisers and believers in witch-magic—a fact which was only poorly concealed by our ancestors in the medical art. Thus to quote again regarding Brown: his theories led him to attempt to excite the opposite emotions in his patients, and the depressed melancholics were subjected to the cruellest alarms. Avicenna, in the eleventh century, was the father of the whirling chair. Electricity was used in the eighteenth century, and warm baths for mania and cold baths for melancholia were advised at the same time. It is interesting to note that Pargeter, in the same century, recommended snuff, on the assumption that it aids the removal of lymph from the upper respiratory tract, and that the sneezing stimulates the nervous system. Dr. Lewis omits any discussion of the "humane" aspects of treatment, but these have been fully and frequently considered elsewhere.

THE BIRTHDAY HONOURS

ON page 1256 will be found the names of the members of the medical profession who have received honours on the occasion of the King's birthday, but in addition to those who have a place on the Medical Register there are others in the list whose work has been discharged either in close alliance with medicine or in fields where their activities make for the promotion of medicine. Everyone will recognise among these as one deserving of public honour Miss A. F. Lloyd Still, whose services alike as president of the International Council of Nurses and matron of St. Thomas's Hospital have been of high importance. Miss Lloyd Still becomes D.B.E. Among the new knight bachelors will be found Captain Ian Fraser, M.P., chairman of the Executive Council of St. Dunstan's, whose zealous activity on behalf of the blind commands admiration. Miss Nancy Stephen, in connexion with the Red Cross Society, has laboured for blinded ex-soldiers in the Commonwealth of Australia and receives the O.B.E., and the same distinction falls to Miss Ethel Rose Collins, R.R.C., principal matron, Queen Alexandra's Imperial Military Nursing Service. The M.B.E. has been awarded to Mr. Norman Casey, superintendent of prisons in Fiji, and Mr. Alfred Nicholls, superintendent of police and prisons at St. Helena. Mrs. Ann Maria Greenwood, matron at the British Military Families Hospital, Hyderabad, receives the M.B.E., as also do Miss Sarah Jane Lambert, R.R.C., county nursing superintendent and inspector of midwives, Isle of Wight, and Miss Mabel Elsie Wolff, inspector of midwives, Sudan. The Kaisar-i-Hind Gold Medal has been awarded to Miss Lena Benjamin, superintendent of the American Baptist Mission Hospital, Madras; and to Mrs. Jeenabai Duggan, of Bombay. To all the medical men and women in the honours list, and equally to those whose coöperation in their work has been signalled out, we offer congratulations.

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[1] Jour. Ment. Sci., 1934, lxxx., 1.

ANNOTATIONS

THE SHENLEY MENTAL HOSPITAL

IN opening this hospital last week, H.M. the King spoke of recent advance in ideas governing the treatment of mental disease and of the opportunity offered by the Mental Treatment Act, 1930. As far as this country is concerned the Shenley Hospital represents a new development; treatment of the poorer classes in Middlesex is now to be undertaken in surroundings and under conditions which have previously only been open to the middle and upper classes. At all mental hospitals of recent years the villa system has been adopted when new building was required. These plans have been fostered and encouraged by the Board of Control, under the chairmanship of Mr. L. G. Brock. But the villas have always been built in proximity to the older buildings and have shared their drawbacks. Too often patients in new villas have had to be transferred to wards in older wings with airing-courts surrounded by brick walls. Shenley will house not fewer patients than the average county mental hospital; ultimately there is to be accommodation for 2000 without overcrowding, all living in communities of not more than 45 patients per unit. The account which we gave in our last issue (p. 1198) of the actual buildings showed how every new and up-to-date principle in psychiatry has been embodied in the hospital. Every member of the profession, whether specially interested in psychological medicine or not, will watch with keen interest the results of the Shenley Hospital; for the principles therein realised spring from the recognition that the mental patient is worthy of as close study, sympathy, and encouragement as his neighbour whose affliction is only physical. In time other counties will be enlightened enough to build hospitals after this new pattern.

THE NEW GERMAN VACCINATION LAW

THE Home Secretary of the Reich has promised a revision of the Vaccination Law in force which dates from April 8th, 1874, and as it is taking him longer than he expected to draw up, and time presses, he has issued[1] instructions to public vaccinators how to carry on in the meantime. Under the 1874 law primary vaccination was compulsory within the first year of life, apart from medical exemption, and a revaccination in the twelfth year. The instruction was to make four shallow cuts not more than 1 cm. long and at least 2 cm. apart. The prescribed routine technique is now to make two shallow cuts only 3 mm. long and at least 2 cm. apart on the right upper arm, the left upper arm being reserved for revaccination. Other sites are permissible if preference is expressed for them. Vaccination is commonly to be carried out at regular sessions specially arranged for the purpose, but the public vaccinator must vaccinate at other times and places should parents or guardians insist upon it. He must at all times be accessible to parents or guardians who observe anything unusual after the vaccination. He is given a good deal of discretion as to postponement for one or two years. In every case inquiry has to be made as to the existence of infectious illness or skin eruptions of any kind at the vaccinee's home and whether the vaccinee is subject to any skin complaint or has any liability to convulsions. Special emphasis is laid on the importance of postponement should there have been inflammatory disease of the central nervous system in the household or any story of mishap after a previous vaccination in the family, whether well authenticated or not. Finally, emphasis is laid on the duty of public vaccinators to instruct the population in their neighbourhood about the nature and purpose of vaccination by every means within their power.

THE SUCCESS OF SANATORIUM TREATMENT

AT first sight it would seem to be a simple enough task to measure the degree of success which attends sanatorium treatment. In reality, as Dr. A. S. MacNalty has pointed out,[1] it is extremely difficult, for physicians have different standards of selection and classification of patients, the after-histories of patients have not been collected for a sufficient number of years, and the data at present available are very scanty. Still more difficult is it to determine the influence that the development of sanatorium methods has had not only upon the lives of the patients but on the general mortality for which tuberculosis is responsible. It is probable that numerous factors have contributed to the decline in the tuberculosis death-rate observed for many years. To isolate the part played by one possible influence is a precarious task. Using the vital statistics of the provinces of Canada Dr. Madge Macklin has recently made an attempt to answer the question.[2] For each of the seven provinces she has determined the tuberculosis death-rates in 1921–29, by age and sex, and has placed alongside them the sanatorium provision made in each area, the latter being expressed in two ways: first with respect to the number of sanatorium beds per 100,000 of the population, secondly with respect to the number of beds per 1000 deaths from tuberculosis. Using the second criterion as the better measure, there appears to be a definite relationship between the accommodation existing for the treatment of patients and the total death-rate from the disease. Those provinces having the best sanatorium facilities have the lowest tuberculosis death-rate, and in 1901, before the introduction of sanatorium treatment, the same differences between the mortality-rates of the provinces were not apparent. The provinces making the largest provision for sanatorium treatment have recorded the greatest improvement in the death-rate. Dr. Macklin therefore suggests that the considerable expense which sanatorium treatment entails is justified, both for the better chance of recovery that it affords the patient and still more for the protection from infection which it confers upon the much larger group outside. She does not overlook the fact that this conclusion is justifiable *only* if all other factors contributing to tuberculosis mortality are identical in the groups compared with respect to sanatorium treatment. This proviso is vital to her thesis and, indeed, in her comparison of the tuberculosis death-rates with beds per 1000 tuberculosis deaths it is difficult to be sure which is the cart and which the horse. For instance, if the provinces made approximately equal provision of beds—and as measured per 100,000 of population the differences are not very large (except in Quebec)—the area with the lowest death-rate in 1921–29 and the greatest rate of improvement must inevitably show the highest number of beds per 1000 tuberculosis deaths, although sanatorium provision may have played no part in the decline. It seems impossible to prove the complete absence of other factors contributing to the results shown—the fact that the provinces differ in one aspect of public health activity suggests that they may differ in others. The assumption that sanatorium treatment is the only variable appears a bold one: without it the case remains unproven.

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[1] Münch. med. Woch., May 4th, p. 700.

[1] Ministry of Health. Reports on Public Health and Medical Subjects, No. 64.

[2] Trans. of Amer. Hospital Assoc., 1934.

CORTICAL EXTRACT BY MOUTH

EXPERIMENTS recorded by A. Grollman and W. M. Firor[1] again raise the question whether extracts of suprarenal cortex can usefully be given by mouth to patients with Addison's disease. A dried cortical extract was used for many years at the Mayo Clinic with some apparent benefit as part of the Muirhead regimen; H. S. Stannus last year reported a case in which dried cortex by mouth seemed for a time to be more beneficial than injections of cortical extract; and J. M. Rogoff (1932) has found a glycerin extract of the cortex (interrenalin) "effective in prolonging life and relieving symptoms in advanced Addison's disease" when given orally. Levy Simpson[2] administered Rogoff's extract by mouth to one patient and obtained "definite and considerable improvement," but he found that subsequent batches of a glycerin extract prepared by other chemists produced, when given by mouth, "trembling, shakiness, pallor, tightness across chest, nausea and vomiting"—perhaps because it contained adrenaline. With G. E. Vilvandré, he showed that ingestion of a 1/1000 solution of adrenaline will sometimes cause colicky abdominal pain associated with jejunal contractions; and there may be similar pain when dried suprarenal gland is taken by patients with Addison's disease.

Grollman and Firor have found it possible to prolong the survival of adrenalectomised rats and dogs by giving them a preparation of cortical tissue through a stomach-tube, but the dose required was five times the dose for injection, and (contrary to the experience of Britton, Flippin, and Silvette with cats) the remedy was not effective when the animal was already prostrate with adrenal insufficiency. The refined extract is at present far too expensive for use under these doubtful conditions, and efforts were accordingly made to prepare cruder products which would be equally efficacious for oral administration. Unfortunately the suprarenal gland is apt to be highly toxic when ingested, because of the breakdown of adrenaline into phenolic derivatives, and before making the extracts it was necessary to take great care that all the medulla should be dissected away from the cortex soon after slaughter of the cattle from which the glands were obtained. With this precaution the crude extracts were almost as troublesome to prepare as a refined one. The next step therefore was to explore once more the possibilities of administering glandular tissue itself. The older clinicians used whole gland in Addison's disease, and without conspicuous success; but the reason why it was ineffective therapeutically apparently is that the cortical hormone is rapidly oxidised by enzyme action after death. Grollman and Firor claim to have got over this difficulty by destroying the enzyme with heat before it can do its work. After dissection from the medulla the cortex is conveyed (frozen in alcohol) to the laboratory and there ground up and dropped into boiling water. With the "enzyme-free" concoction thus obtained a dog was successfully kept alive over a long period, and it is thought that in cases of mild adrenal insufficiency in human beings such preparations might be valuable. But Grollman and Firor admit that the great amount of material which must be ingested "precludes their use in severe cases, in which, moreover, the occurrence of gastro-intestinal symptoms would render their oral administration impossible."

The evidence as a whole suggests that some extracts of suprarenal gland are of value, in not very severe phases of Addison's disease, when given by mouth. Too much must not be expected from this form of treatment in its present state of development; but the fact (referred to by Prof. E. C. Dodds in his Goulstonian lectures[3]) that a simple chemical modification of the œstrin molecule renders it more active by mouth permits us to hope for similar progress in other departments of endocrine therapy. E. C. Kendall and co-workers[4] at the Mayo Clinic report that they have isolated an active crystalline form of the cortical hormone, and state that it is probably an α-hydroxy aldehyde.

A SEVENTEENTH CENTURY PHYSICIAN

Claver Morris was born in Dorsetshire in 1659 and died at Wells, Somerset, in 1726, so that his life of 67 years covered five reigns. His father was a country parson who had served in the Civil war on the Royalist side as a cornet of horse. Morris matriculated at New Inn Hall, Oxford, in 1675, took his B.A. in 1679, his M.B. in 1683, and M.D. in 1691. In 1683 he became an Extra Licentiate of the Royal College of Physicians. He set up in practice at Wells as a consulting physician and wrote a diary dealing with events in his life between 1685 and 1726. This diary, edited by Dr. Edmund Hobhouse, has recently been published[5]; it contains his accounts, the names of all his patients, and the fees he received. We learn, for example, that the interment of the first Mrs. Morris in 1689 cost £50, of which £14 11s. was for gloves provided for the mourners. Until he married again Morris paid a widower's tax of 26s. a year. A house that he built for himself in Wells, and began in 1699, cost £807, and is still standing (1933) and in the occupation of one of the prebendaries.

The features of chief interest in this diary are admirably epitomised and expounded in a series of introductory chapters by Dr. Edmund Hobhouse, who brings to the task expert knowledge both medical and antiquarian. The reader is able to form an excellent idea of the kind of man Morris was, and of the conditions under which he lived. He occupied a good social position, did not operate or attend confinements, and seems to have occupied himself chiefly in writing prescriptions. He possessed a laboratory in his house and was evidently an expert pharmacist who spent much time in chemical experiment. The fees charged by him were strictly proportioned to the status of his patients—e.g., in Wells he charged the poor half a crown, the small tradespeople five shillings, the substantial townspeople and officials half a guinea, and the gentry and clergy a guinea. Dr. Hobhouse remarks that as the value of money then was four or five times that of to-day these fees were high. On the other hand, Morris's fees for country visits appear low—e.g., two guineas for a journey of 17 miles, and only 12 guineas for a visit that took him away for nearly a week. After the first three years his total earnings were £200–£300 a year, so that Dr. Hobhouse thinks that for the last 15 years of his life Morris made the equivalent of over £1000 a year. As his three wives were all possessed of money, and Morris was an excellent business man, he became well to do, acquired a lot of land around Wells, and was on close terms of friendship with many of the county families.

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[1] Bull. Johns Hopkins Hosp., April, 1934, p. 216.

[2] Proc. Roy. Soc. Med., 1934, xxvii., 390.

[3] THE LANCET, May 5th, 1934, p. 934.

[4] Proc. Staff Meet. Mayo Clin., April 25th, 1934.

[5] The Diary of a West Country Physician A.D. 1684–1726. Edited by Edmund Hobhouse, M.D. London: Simpkin Marshall Ltd. 1934. Pp. 155. 5s.

Perhaps wisely, considering the state of medical knowledge at the time, Morris rarely mentions his patients' ailments; but his efforts to relieve them by bleeding, purging, clysters, sweating, or emetics are recorded. When these failed he had little else to offer. He was very fond of music and was the mainstay of a local musical society; in his will he expressed a wish that "A Consort of Musick of three Sonatas at least" should be performed in the room where his body was placed before it was carried out for interment. The impression derived from a study of his diary is that Morris lived a useful and prosperous life and deserved well of his fellow men, with whom he was obviously popular. He was buried in the cathedral, and, according to the fashion of the times, a highly eulogistic epitaph, in Latin, was inscribed on his monument in the cloisters of Wells.

HEAT REGULATION IN THE TREATMENT OF GANGRENE

Two American physicians, Dr. I. Starr[1] and Dr. E. L. Sevringhaus,[2] have been treating gangrene of the lower limbs in a foot cradle constructed to maintain a constant temperature as nearly as possible that of the blood. Starr argues that wherever the essential lesion is in the peripheral vessels it is as important that the temperature should not rise too high as that the limb should be protected against cold: an excessively hot environment may produce cyanosis as surely as will exposure to cold, for the vascular disease prevents the increase of circulation that should accompany the increased metabolism of higher temperatures. The increased demand for oxygen is not satisfied, and pain, which has been relieved by a lesser degree of heat, returns as the cyanosis reappears.

The cradle, of which Dr. Starr has designed one pattern and Dr. Sevringhaus another, is equipped with a bimetallic thermoregulator, and the heat is supplied, as in the more usual type of bed cradle, by incandescent lamps. Reliance is placed on convection for the distribution of heat throughout the cradle, and the inaccuracy thus introduced is not more than 2–3° if the cradle is covered by the blankets. Starr has found some advantage in supplying oxygen to the limb for absorption through the skin. By a special modification of the cradle, cradle and limb are enclosed in a rubber bag, with all wiring and contact points outside the bag to avoid fire. The percentage of oxygen in contact with the leg is maintained at 60–80 by a fresh supply introduced three or four times daily; accumulation of moisture is circumvented by the introduction of copper wire trays holding calcium chloride, and wet gangrene is thus prevented. The cradle designed by Sevringhaus is a modification of Starr's, but on a considerably larger scale. It is a small chamber, covering all the lower part of the bed, and the feet and lower parts of the legs can lie in it without undue confinement, being visible through windows at the side; they are carefully separated from possible contact with hot and rough objects by means of baffles. Both authors are enthusiastic about the value of the constant temperature in the treatment of gangrene; it relieves pain and it promotes healing. Starr quotes five cases in which limbs were saved after amputation was thought to be inevitable on the observation of competent surgeons. Desiccation by the use of calcium chloride, may, he says, convert a wet into a dry gangrene and so prevent infection of the necrotic area.

A MEMORIAL TO DR. HAIG FERGUSON

It is not given to many men to hold the place the late Dr. Haig Ferguson won for himself by the force of his personality. Skill in his own particular department of medicine earned the respect and honour of the whole medical profession in Edinburgh and far beyond. Less well known was the extent to which, as a wise and far-seeing philanthropist, he influenced and helped many hundreds of needy girls at a critical period of their lives. For over 40 years he identified himself with the fortunes and work of the Lauriston Home where both prenatal and postnatal care are provided for unmarried mothers and a refuge afforded to those who are often in the extreme of misery. This home, which is lineally descended from the St. Luke's Home, founded by Halliday Croom, has a somewhat precarious existence, being entirely dependent upon the slender payments of the inmates, along with such subscriptions as a rather restricted circle of friends contribute. These, being mainly due to the personal influence of Dr. Haig Ferguson, will now tend to cease. An appeal is now being made by an influential committee, of which Prof. R. W. Johnstone is chairman, for a sum of £5000 which would place the work on a lasting and permanent basis and perpetuate the memory of a great and good man.

Donations for the "Haig Ferguson Memorial Home" may be sent to Mr. R. H. Wallace Williamson, C.A., 37, Melville-street, Edinburgh.

THE ISOLATED KUPFFER CELL

By the employment of a most ingenious device Peyton Rous and J. W. Beard[1] have been able to isolate and study the Kupffer cells of the liver in the rabbit and dog. The animal receives a series of intravenous injections of gamma ferric oxide a part of which is taken up and stored in the Kupffer cells. The liver is washed out with tyrode solution under low pressure. When the washings become clear of blood the pressure is raised and the Kupffer cells are loosened and washed out by alternately distending the liver with fluid and gently massaging the organ while the fluid is released. The Kupffer cells are next drawn out of suspension by causing the fluid to flow in a thin layer through a glass chamber under and around a long glass tube the outside of which is coated with a collodion membrane, while the inside contains a rod of soft iron. A giant eye magnet is fixed vertically beneath this chamber and, on passing a current, the iron rod in the tube becomes secondarily magnetised and the Kupffer cells collect on the collodion membrane.

The isolated cells were studied both by the supravital technique and by tissue culture in plasma and in serum. They appeared in supravital preparations as spherical or ovoid cells of about 30 to 40 μ though forms engorged with many particles might be as large as 100 μ. They flatten out on a glass surface and extrude a characteristic large circular membrane of clear cytoplasm which maintains a slow but constant motion compared by the authors with the flow of lava. They segregate neutral red promptly and in all respects are typical clasmatocytes but with certain morphological features that serve to differentiate them from clasmatocytes obtained from other organs of the body. The cells are extraordinarily sticky and cling to anything with which they come into contact. The stickiness of leucocytes, according to the authors, is negligible by comparison. They are also very sensitive to injury and withstand changes in temperature and pH only poorly. In tissue culture very little special activity was observed until the cells were brought into contact with a layer of lens paper. This seems to have stimulated them by providing a kind of window-ladder, and it was found that the healthy cells climbed from the floor of the dish in which they were placed on to the paper and spaced themselves at almost regular intervals along the surface of the fibres. They moved slowly along the fibres and tended to wrap themselves round those that were narrow, assuming a spindle form. It was rarely found that cytoplasmic processes of the cells extended between adjacent fibres, and this suggests that histologists are wrong in visualising the Kupffer cell as a cell that plants itself athwart the blood stream in the liver sinuses, attached by a few tentacles only to the adjoining wall. It is much more likely that the cell lies firmly like a slug along the wall. This view is supported by the observation that it is impossible to dislodge the Kupffer cells of the normal liver in appreciable numbers by forcible perfusion.

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[1] Amer. Jour. Med. Sci., April, 1934, p. 498.

[2] Ibid., p. 509.

[1] Jour. Exp. Med., 1934, lix., 577.

ENDOMETRIOSIS

ENDOMETRIOSIS is the name given to the condition in which endometrial tissue, in the form of nodular or diffuse tumour-like masses, is found in abnormal situations. The tumours have no capsule, and though benign in structure, and usually in behaviour, may infiltrate surrounding tissues in clinically malignant fashion. Whether metastasis ever takes place is still uncertain. The ectopic endometrium undergoes decidual and menstrual changes, and these can be detected in superficial tumours, which increase in size and become tender at the menstrual period.

A distinction is generally made between internal and external endometriosis. It is called internal when endometrial tissue invades the wall of the uterus or Fallopian tube; it is external when it involves the external surface of the uterus or tube, the ovary, rectovaginal space, bladder, or intestine, or when it occurs extraperitoneally, in the groin, at the umbilicus, in laparotomy scars, in the vagina or perineum. The clinical features naturally vary with the location of the disease. Those of the genital type have lately been well described by H. Heidler.[1] The obstinate character of the dysmenorrhœa and menorrhagia—the chief symptoms—and their failure to respond to medical measures, diathermy and curettage are shown to be an important differential sign. Two of the rarer sites—the bladder and the scar of a laparotomy wound—are dealt with respectively by R. B. Phillips [2] and H. F. Harbitz.[3] Phillips has collected 29 cases of vesical endometriosis, including one of his own. Frequency and dysuria are the earliest symptoms, and are often cyclical; hæmaturia occurs later. The only means of differential diagnosis is by cystoscopy, and if necessary biopsy. Harbitz's monograph deals with external endometriosis in general, and especially with the form developing in scars. He desribes 17 cases of his own, and reviews 176 others. The condition is usually a sequel to operations upon the uterus or adnexa, especially such as involve opening the uterine cavity (subtotal hysterectomy, Cæsarean section); but in 15 cases it followed appendicectomy. Hysterotomy in early pregnancy seems especially liable to result in endometriosis of the scar; indeed, of Harbitz's 17 cases 14 followed this operation. He considers at length the various theories of the causation of external endometriosis, and concludes that implantation following the escape of viable particles of endometrium—whether by direct extension through the wall of the uterus or tube, or by retrograde menstruation, operation, or in other ways—suffices to explain all cases.

INTRAVENOUS ALCOHOL FOR ACUTE BARBITURISM

IN a recent communication[1] to the French Academy of Medicine, Prof. Carrière, Dr. C. Huriez, and Dr. P. Willoquet, of Lille, gave an account of their clinical observations and animal experiments with alcohol as an antidote to the barbituric group of drugs. The case which first suggested this treatment to them was that of a woman of 23, who swallowed 5·0 g. of veronal and then 100 c.cm. of 95 per cent. alcohol to make sure. Instead of being comatose for at least 24 hours as she would have been had she taken this dose of veronal by itself, she slept only for five hours and recovered without more ado. Shortly after observing this case, the authors of this communication read an account by Dr. Le Loupp of a patient, a man aged 38, who irrigated an overdose of gardenal with cider, port, and brandy, drinking five or six glasses of the latter. In this case also the recovery of the patient seemed to be due to the conflicting action of the gardenal and the alcohol. It may be recalled in passing that injections of somnifene are beneficial in delirium tremens. The animal experiments consisted of injecting barbiturates into rabbits subsequently given intravenous injections of alcohol. The results were confirmatory of the clinical observations. Accordingly, on April 13th last, the first therapeutic attempt to exploit these observations was made on a woman, aged 22, brought to hospital in a state of slight coma. It transpired that she had taken 1·50 g. of gardenal. She was given an intravenous injection of 30 per cent. alcohol 20 c.cm. once an hour, and on the fourth injection she awoke to complete consciousness. The dosage in this case was known to be safe, for from 30 to 50 c.cm. of 30 per cent. alcohol have been given by intravenous injection with impunity for pulmonary suppuration. Though the optimum dosage remains to be determined, it is probable that at least 30 c.cm. of 30 per cent. alcohol should be given every hour till the patient awakes, the intravenous route being chosen to gain time.

EFFECT OF EXTREMELY HIGH ALTITUDE ON MUCOUS MEMBRANES

IN order to study the effects of residence at a very high altitude on the upper respiratory tract, a study which he believes has not previously been made, Dr. Ernesto Raffo, of Lima, travelled to Casapalca, a mining centre in the Andes of Peru situated at a height of 13,621 feet above sea-level, where the barometric pressure is only 19 inches of mercury.

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[1] Wien. klin. Woch., April 13th, 1934, p. 467.
[2] Jour. Obst. and Gyn. Brit. Emp., April, 1934, p. 165.
[3] Acta Chir. Scandinavica, 1934, vol. lxxiv., supp. xxx.

[1] Bull. de l'acad. de méd., 1934, No. 18.

He made observations[1] on residents already acclimatised, and on members of his party who had recently arrived from sea-level; the latter, however, could not be investigated thoroughly, as they all suffered from mountain sickness. In the majority of the inhabitants examined, the nasal mucous membrane was of a deep red colour, sometimes with a crusting secretion, and there was dilatation of the capillaries of the nasal system over Kiesselbach's area, which explained the liability to epistaxis; the soft palate was wine-red in colour, interspersed with little violet spots; there was a slight œdema and congestion of the uvula, and the vessels on the posterior pharyngeal wall were dilated. The hard palate was also congested, but to a less degree, as indeed was the whole of the buccal mucous membrane. Similar alterations were to be seen in the larynx, where the vocal cords were congested and streaked with vessels; a hoarse voice is common in these regions. Retraction of the drum was observed and, very constantly, hyperæmia of the membrane with dilatation of the vessels along the malleus. Chronic middle-ear and tubal catarrh, with deafness of the conduction type, is very frequent; such lesions are more marked in those with nasal obstruction or sinusitis, which are also of very common occurrence. In 14 natives he examined the sensitivity of the labyrinth by the caloric and rotary tests, and found it increased in nine cases. A similar, but slighter, hyperæmia of the mucous membranes was found in the people who had accompanied Dr. Raffo from Lima; no difference in acuity of hearing was detected, but the excitability of the labyrinth was increased. All these alterations are no doubt fairly to be attributed to the reduced atmospheric pressure and the extreme dryness of the air at this immense altitude. It does not follow that a moderate elevation has any harmful effect upon the mucous membranes.

PRIMARY CÆCOSTOMY IN APPENDICITIS

ILEUS, whether paralytic or due to post-operative adhesions, is the most dreaded of all complications of acute appendicitis. E. R. Easton and W. J. Watson[2] believe that its occurrence can be predicted at the time of appendicectomy, and that by deliberate institution of a fæcal fistula a fatal issue can be prevented. The death-rate from appendicitis is causing much concern in the United States at the present time: the deaths per 100,000 of the population in 1929 had risen to the figure of 15·2, as compared with 11·8 in 1919. While recognising that the use of purgatives by the patient in the early stages of stomach-ache, and delay in operating, are two definite factors contributing to the high mortality from this disease, Easton and Watson have concerned themselves chiefly with improvement of operative technique. They believe that in the exercise of correct judgment in dealing, at the time of operation, with associated complications, there lies great hope of obtaining a successful outcome in even the worst type of case. Removal of the appendix is not all that is asked of the surgeon, and especially is this true where the appendix is either perforated or gangrenous, and where the condition is complicated by abscess-formation or by diffuse peritonitis. In an attempt to determine the factors that might assist recovery from complications Easton and Watson were struck by the fact that in a series of 100 complicated cases, 18 had fæcal fistula, either deliberately produced by operation or arising spontaneously, and that of these 18 patients only 1 died, though there were 12 deaths in the complete series of 100. The cases in which they advise primary cæcostomy or enterostomy are those in which the gut is distended, with a dull lustreless peritoneal coat and adhesions between the coils. Where the peritonitis is diffuse, they recommend that the opening should be at least a foot above the ileocæcal junction; in the more common condition, in which there is plastic peritonitis, or abscess-formation around the terminal ileum and the cæcum, they advise cæcostomy. They use Wagenstein's technique for enterostomy, a number 14 (French) catheter draining the bowel. Cæcostomy they perform through a stab-wound lateral to the main abdominal incision; here a number 20 (French) catheter is inserted, and after passing through the ileocæcal valve is guided into the ileum. A series of purse-string sutures hold it into position in the cæcum, and the latter is held to each end of the peritoneal wound by a catgut stitch.

The institution of intestinal drainage is said to forestall the onset of paralytic ileus, and, by preventing distension of the bowel by gas and fluid, to preserve its normal motion, and to avoid the formation of obstructive adhesions. As a rule no special difficulty is to be anticipated from the fistula. Most cases are said to heal spontaneously; about one in seven will require an operation for closure. Easton and Watson believe that a primary drainage of the bowel is so much more likely to be life-saving than a secondary drainage after the onset of symptoms of ileus, that its performance should be considered in every complicated case of appendicitis.

KING EDWARD'S FUND

THE Prince of Wales presided at the annual meeting of King Edward's Hospital Fund for London on Tuesday, when he announced that the Fund had again maintained its distribution at £300,000 entirely out of annual income. For the seventh year in succession the voluntary hospitals of London had shown a credit balance of income over expenditure, the balance for 1933 being the largest of the seven. The increase of income was no doubt partly due to exceptionally large legacies but other voluntary income was keeping very steady. Payment from patients continued to increase, either direct or through contributory schemes like the Hospital Saving Association which in 1932 paid the London hospitals £340,000. The King's Fund, said the Prince, was gradually coming to exercise some of the functions of a kind of central body for the voluntary hospitals of London, using its influence while respecting their individuality and their freedom. The activities of the Fund's propaganda committee included a fresh series of mock trials and the miniature hospital which was now touring in the north of England, and other schemes were in preparation. The parliamentary committee was promoting a general Bill authorising hospitals to provide pay beds for patients of moderate means. They had been told, he said, that the stream of voluntary gifts was drying up; recent gifts for building schemes suggested a kind of drying up which might well excite the envy of the Metropolitan Water Board.

THE third Macewen memorial lecture of the University of Glasgow will be given by Prof. René Leriche, of the University of Lyons, on Tuesday, June 19th, at 4.15 P.M. Prof. Leriche will speak on experimental and clinical researches on angina pectoris and its surgical treatment. The lecture is open to past and present students of medicine and to others interested.

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[1] Rév. sud-amér. de méd. et de chir., 1934, v., 91.

[2] Surg., Gyn., and Obst., April, 1934, p. 762.

THE PREVENTIVE ASPECTS OF MEDICINE

A Series of Lectures in progress at King's College Hospital Medical School

XXV.—PUBLIC AGENCIES WHICH EXIST FOR THE PREVENTION OF DISEASE

THE public agencies which exist for the prevention of disease are now so numerous that little beyond their bare recital will be possible within the compass of a single lecture. It will be convenient to group them under 11 headings:

1. Those dealing with environmental hygiene and the purity of air, food, and water.
2. Control of the acute infectious diseases.
3. The medical supervision of expectant, parturient, and nursing mothers, and of infants and school-children.
4. Organised national schemes for the control of tuberculosis and venereal diseases.
5. The control of industrial diseases.
6. The National Health Insurance scheme.
7. General hospital provision and poor-law domiciliary medical relief.
8. Mental ill-health.
9. The prevention of blindness.
10. Medical research.
11. Education of the public in matters affecting health.

Environmental Hygiene and Purity of Air, Food, and Water

Although the efforts of medical officers of health up to the beginning of this century were largely occupied in a struggle to improve environmental hygiene, yet a knowledge of the principles involved had been known from early times. The tragedy of the industrial revolution in this country was that urban communities were allowed to develop without any thought as to the penalty which would surely have to be paid later on for their failure to plan and control their areas and provide the amenities requisite for health.

As an indication of early knowledge on these matters, the Mosaic Law indicated that the ground used for dwellings must be free from accumulations of filth.

The elaborate arrangements made by the Romans for a supply of water to their cities are well known. Nineveh, which was a city centuries before Rome was, had a drainage system. Agrigentum, Athens, and Rome are all known to have had public drains. In the twenty-second Book of the Odyssey Homer describes the burning of sulphur by Ulysses, a process for purifying environment still carried out by sanitary authorities. Unpleasant smells were associated with outbreaks of disease—as indeed they still are—and so long ago as 1283, the City of London passed an ordinance to control the melting of tallow.

I would refer those who are interested in the early history of public health to Sir John Simon's classic book, "English Sanitary Institutions."

Responsibility for ensuring a healthy environment is now placed on the local sanitary authorities. These are the county boroughs—large towns which are independent of the county administration and which exercise within their areas all local government functions, including administration of the laws relating to public health, education, poor-law, highways, and, outside the metropolitan area, control of the police. They are responsible direct to the Ministry of Health and the other government departments concerned. With a few exceptions, such as Canterbury, they contain populations in excess of 50,000, and in the case of Birmingham the population exceeds a million.

Other sanitary authorities are the City of London, municipal and metropolitan boroughs, and urban and rural district councils.

All these sanitary authorities must appoint a medical officer of health and a sanitary inspector whose duties are set out in an order of the Ministry of Health. They have many executive functions and they advise their councils on matters within their province. The first of the duties of a medical officer of health is "to inform himself as far as practicable respecting all influences affecting or threatening to affect injuriously the public health within the district." He must also inspect his district to keep himself informed of the conditions injurious to health existing therein.

In what may be called large-scale operations, the county councils function in all areas other than those of the county boroughs. They must appoint a county medical officer of health. In certain parts of the country there are combinations of authorities for specified purposes, or ad-hoc bodies have been set up—e.g., for water-supply through the agency of water boards, for sewerage and disposal of sewage by drainage boards. There are also river pollution prevention boards, regional town planning boards, asylums and joint hospital boards, and so forth. If an analysis is made of the functions of local authorities it will be found that most of them have some relationship to the health of the community.

A brief summary of these functions with respect to this subsection of my paper is as follows:—

Securing an adequate supply of pure water for each household.

The making and enforcement of building by-laws to secure sufficiency of air space around a house, its sound construction, prevention of rising damp, &c.

The making and enforcement of drainage by-laws.

The construction of sewers and the disposal of sewage.

Provision for the collection and disposal of refuse.

The abatement of nuisances.

The prevention of nuisance from smoke.

The control by licensing and inspection of common and seamen's lodging-houses, of houses-let-in-lodgings, and offensive trades.

Administration of the Housing Acts, including the power to build new houses, the duty to abolish slums and rehouse those dispossessed, and to require the repair of houses where this is necessary.

The inspection of food prepared or sold in the district with power to seize and condemn unsound food and prosecute the vendor.

The taking of samples of food and drink for analysis by the public analyst, and prosecution of those selling food not of the nature, substance, and quality demanded.

The inspection and licensing of dairies, cowsheds, and milk-shops, and of bakehouses.

They also have power, and in some cases the duty, to provide public mortuaries, burial grounds, crematoria, parks and open spaces, baths and wash-houses, and so forth. Appointments of registrars of births and deaths must also be made. They also administer the law concerning canal boats, tents and vans, and other unusual places used for human habitation, and are responsible for town planning.

Speaking generally, these duties are carried out with considerable efficiency and much of the recent decline in the national death-rate may be ascribed to the enormous improvement in the environmental conditions under which urban dwellers live as a result of the activities of the local sanitary authorities.

Control of the Acute Infectious Diseases

Much of the work of the pioneers of public health was devoted to the control of the spread of the acute infectious diseases. The cholera outbreaks in this country of 1832, 1849, 1854, and 1866 profoundly stirred public opinion and were a direct cause of our early sanitary legislation. To-day this control of the acute infections may be discussed from two angles, first, the prevention of the introduction of disease from abroad, and, secondly, the steps taken to control the endemic acute infections.

With regard to the first, the original method was that of quarantine; the personnel of a vessel coming from an infected port was inspected, and if a case of plague, cholera, or yellow fever were discovered, the vessel was sent to a special mooring place and detained there for a considerable period. This was not only very costly for the shipowner but did not in fact prevent the spread of the disease, as illicit communication with the shore was very difficult to control.

More enlightened methods are now in use. Various international conventions have been held in order to secure uniformity of practice throughout the maritime nations of the world. The local agencies in this country for enforcing the law are the port sanitary authorities, each with its own medical officer of health. In most countries the port sanitary service is national and not local as in England and Wales, but the Ministry of Health keep close watch over this branch of public health and the national exchequer pays half the cost.

A vessel coming from a foreign port sends a wireless message to the port sanitary authority if there is any suspected infectious disease on board or any circumstances require the attention of the port medical officer of health; the message states the ports from which she has come and whether or not there have been, or are, cases of sickness on board. The customs officers also question the master of the vessel as soon as they board her, and in vessels without wireless, or if the sending of a message has been neglected, this may be the first intimation that there are cases of sickness on board. In cases where there is any reason to suspect the presence of infectious disease the port medical officer boards the vessel and examines all passengers and members of the crew before anyone is allowed to go ashore.

If a case of a serious infectious disease is found, the patient is removed to hospital and the passengers are not allowed to leave until they have supplied particulars of the addresses to which they are going. This information is then sent forthwith to the medical officer of health of the district to which the passenger is proceeding, and it is his duty to keep the person under surveillance, which for this purpose means daily inspection, until all risk of his contracting the infection has passed. During recent years the most common disease for which this procedure has been invoked is small-pox, and not infrequently long lists of small-pox contacts have been received in London, for distribution throughout the country, of passengers for England disembarked at Marseilles. Similarly, Plymouth, the Port of London, Liverpool, and Glasgow often despatch long lists to various parts of the country. If the crew is being paid off a similar procedure takes place.

One of the greatest trials of a port medical officer is when it is reported to him that dead rats have been found in, for example, a grain ship from the River Plate, or one which has come from India and the Far East. When this happens, all unloading of the cargo must cease, the rats must be examined for plague, and if this is found, a complete fumigation of the vessel with hydrogen cyanide must take place. Any passengers must be traced and put under surveillance, the crew must be kept under close observation, and every possible step taken to prevent rats from getting ashore. To lessen the risk of rats conveying plague from country to country, periodical disinfestation is now required or the production of a certificate—valid for six months—to the effect that the rats are so few that exemption from deratisation may be given.

The increasing use of aeroplanes as a means of rapid transport from country to country has added another risk of the introduction of serious epidemic diseases from abroad, and an international convention has recently considered the matter and made recommendations as to the most suitable methods of dealing with this menace. Speaking quite generally, the recommendations as to examination on entry to the country and surveillance of contacts follow the same lines as those successfully adopted for dealing with ships.

A function of port sanitary authorities which may be mentioned is the medical inspection of aliens. This is not primarily designed to detect cases of infection or contagion, though, in the early days, cases of trachoma in transmigrants were not infrequently seen, but to ensure that no alien is allowed to enter the country who is likely to become a charge, through illness, on public funds.

Akin to the above-mentioned methods for preventing the introduction of human diseases are those administered through the Ministry of Agriculture to prevent the introduction of diseases of animals which sometimes affect man. Rabies has now disappeared in this country, but it would almost certainly reappear if dogs from abroad were allowed free access. All such dogs must spend some months in quarantine before they are allowed to proceed beyond the port of disembarkation. The illegal introduction of dogs from abroad by aeroplane has been attempted, and firm steps have had to be taken to prevent this. As a result of the occurrence of cases of psittacosis, an order has been issued controlling the importation of parrots.

The control of indigenous infectious disease is a matter which concerns all sanitary authorities, and this occupies much of the time of local health officers.

We must first consider what steps are taken to immunise individuals against infectious disease. The vaccination laws date from 1840. We still pay lip service to compulsory vaccination of infants, but where the parents conscientiously object, exemption is readily obtainable and at the present moment less than 50 per cent. of the infants of the country are vaccinated at the public expense by the public vaccinators and those exempted exceed those vaccinated. In fact, the position is so ludicrous that many are now of opinion that we should give up all pretence of requiring compulsory vaccination by statute and simply provide free vaccination for those who would like it.

Local sanitary authorities have power to provide facilities for Schick testing and immunisation against diphtheria, and many are developing this side of their work though public apathy is great and progress is slow.

In chronological order, the first great step taken by public authorities for the purpose of controlling the acute infections, after the provision of facilities for vaccination, was the provision of fever hospitals, most of which date from 40 to 50 years ago. The reason was because at that time scarlet fever was very prevalent and had a very high case-mortality rate. It was thought that the isolation of the patients in hospital would soon bring an epidemic to an end. Unfortunately, experience and a better knowledge of epidemiological laws have shown that that was a vain hope. Most of the susceptible intimate family contacts have already been infected before the patient is removed from home, and for this reason and owing to the existence of missed mild cases the prevalence of scarlet fever has been but little affected by the provision of isolation hospitals. These hospitals are, however, of great value in the treatment of serious cases of the acute infectious diseases. Fortunately, scarlet fever is now of a much milder type than it was a generation ago, though even in this disease severe complications can be prevented by efficient hospital treatment. Cases of diphtheria and typhoid fever are admitted to isolation hospitals and in many areas measles and whooping-cough also.

In fact, many think that where fever hospital beds are limited, complicated cases of measles and uncomplicated cases from unsuitable homes should have a prior claim to admission over uncomplicated cases of scarlet fever.

It is the duty of the medical officer of health of a sanitary authority to take such measures for the prevention of any infectious disease as he is legally authorised to take under any statute in force in the district or by any resolution of his council. In order that he may do this, he must know where the cases of "fever" are, and this he does by means of the "notifications" which he receives from the doctor in attendance (incidentally notification is also required from the head of the household, though in practice it is always left to the doctor). Compulsory notification, under penalty, of certain acute infectious diseases has been statutory since 1899. There is a procedure by which diseases may be added to the list. For example, chicken-pox is often added during the prevalence of small-pox. Measles and whooping-cough are not compulsorily notifiable in most districts, though a few have added them to the list either in respect of every case or of the first case in a family.

Certain diseases are compulsorily notifiable throughout the country under orders made by the Minister of Health. Examples are puerperal pyrexia, acute primary pneumonia, and malaria. A full list of diseases compulsorily notifiable in any district may be obtained on application to the local medical officer of health, who will also supply the necessary forms.

On receipt of a notification the medical officer of health, or more often a sanitary inspector or health visitor, visits the house and completes an inquiry form from which it is desired to learn :—

(1) The date of onset of the disease;

(2) The source of the infection;

(3) The persons with whom the patient has been in contact since he became infectious; and

(4) The steps taken to prevent the spread of the infection.

These forms are studied by the medical officer of health and the necessary action taken thereon. It may be that a "missed" case will be discovered, that the milk-supply or shell-fish are under suspicion, that better arrangements for home isolation are desirable, and so forth.

We are, however, in a changing world with regard to the control of a disease like scarlet fever. The value of removal to hospital is being questioned, as is also that of terminal disinfection. Fumigation by sulphur dioxide or formaldehyde was a universal requirement 20 years ago, but in some areas it is being discontinued. Again, it was thought at one time that the desquamating skin of scarlet fever cases was infectious and the patients were detained in hospital until all desquamation was completed—sometimes for eight or nine weeks and nearly always for six. It has been found by experience that the desquamating skin is not infectious and that it is safe to discharge an uncomplicated case on the twenty-eighth day. Serum treatment is now largely used in fever hospitals for preventing complications and shortening the period of treatment.

I must mention three more points before leaving the acute infectious diseases :—

(1) Diphtheria antitoxin may be supplied free by the local sanitary authority for use by private practitioners.

(2) Most authorities make arrangements under which free facilities are provided for obtaining bacteriological reports on specimens sent by private practitioners such, for example, as reports on throat swabs, on cerebro-spinal fluid, on blood-serum for agglutination tests, and so forth.

(3) A sanitary authority does or can do little to control one of the most serious of the acute infectious diseases—namely, influenza. Influenza itself is not compulsorily notifiable, though acute influenzal pneumonia is. The action of the sanitary authority in times of epidemic consists mainly of endeavouring to secure as much hospital accommodation as possible, and of advising the public of the dangers at such times of frequenting places which are crowded and ill-ventilated. Those who have developed the disease are counselled to remain at home in bed until the risk of spreading the infection has passed, and thus, incidentally, protecting themselves against the risk of serious complications.

W. ALLEN DALEY, M.D., M.R.C.P., D.P.H.
Principal Medical Officer, Public Health Department,
London County Council.[1]

(To be concluded)

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

Surg. Comdr. H. L. P. Peregrine to *Victory*, for R.N.B.

Surg.-Lts. H. E. B. Curjel and H. de B. Kempthorne to *Pembroke*, for R.N.B.

ROYAL ARMY MEDICAL CORPS

Lt.-Col. A. E. B. Jones, having attained the age for retirement, is placed on retd. pay.

Maj. S. J. Barry to be Lt.-Col.

The undermentioned Lts. on prob. are confirmed in their rank: G. L. McLeod and C. B. R. Pollock.

Lt. P. V. O'Reilly resigns his commn.

ARMY DENTAL CORPS

Lt.-Col. A. R. Inglis retires, receiving a gratuity.

Maj. D. Clewer to be Lt.-Col.

Capt. J. W. Vasey to be Maj.

ROYAL AIR FORCE

Flight Lt. A. A. Townsend is promoted to the rank of Squadron Leader.

The undermentioned Flying Officers are promoted to the rank of Flight Lt.: T. C. Macdonald and J. S. Carslaw.

DEPUTY DIRECTOR-GENERAL, A.M.S.

The War Office announces that Col. W. P. MacArthur, D.S.O., F.R.C.P.I., hon. physician to the King, who is at present consulting physician to the Army and professor of tropical medicine at the Royal Army Medical College, has been appointed deputy director-general, Army Medical Services, with effect from Sept. 16th, 1934, in succession to Col. F. D. G. Howell, D.S.O., hon. surgeon to the King, who, on completion of his temporary tenure of the appointment, will proceed to India to take up the appointment of deputy director of medical services at Army Headquarters which will become vacant on Dec. 26th next. Col. MacArthur will be succeeded by Lt.-Col. J. Heatly-Spencer, R.A.M.C.

THE LEISHMAN PRIZE

Maj. F. McKibbin, Royal Army Medical Corps, has been awarded the Leishman Prize for the year 1933, consisting of a silver medal and a sum of £30 for his work in the interests of military hygiene.

The Leishman Prize (Officers) is awarded annually for the best piece of work in any branch of Medicine, Surgery, or the allied sciences, or in connexion with the general duties of the Royal Army Medical Corps, by an officer of the Royal Army Medical Corps, or Army Dental Corps, or by an officer removed from either of these Corps but still on the Active list.

NORTH PERSIAN FORCES MEMORIAL MEDAL

Surg. Lieut.-Com. S. G. Rainsford, Royal Navy, has been awarded the North Persian Forces Memorial Medal for the year 1933, for his paper on Laboratory Methods of Diagnosis of Brucella Infections, published in the *Journal* of the Royal Naval Medical Service, January, 1933.

The North Persian Forces Memorial Medal is awarded annually for the best paper on Tropical Medicine or Hygiene published in any Journal during the preceding twelve months by a Medical Officer, of under twelve years' service, of the Royal Navy, Royal Army Medical Corps, Royal Air Force, Indian Medical Service, or of the Colonial Medical Service, provided the Memorial Committee consider that any of the papers published has attained a standard of merit justifying an award.

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[1] In order to comply with the Council's Standing Orders it is necessary to state that the London County Council accept no responsibility for the author's opinions or conclusions.

SPECIAL ARTICLES

GENERAL MEDICAL COUNCIL

SUMMER SESSION, MAY 29TH–JUNE 2ND, 1934

Penal Cases

A DIVORCE DECREE

The Case of Laurence Handley Ashken, registered as of 28, Hillside-drive, Edgware, Middlesex, L.M.S.S.A. Lond. 1927, who had been summoned to appear before the Council on the following charge :—

> "(1) That being a registered medical practitioner you frequently committed adultery between September, 1931, and January, 1933, with Stolzie May Ferris, a married woman, whom you were attending professionally, of which adultery you were found guilty by the decree of the Probate, Divorce and Admiralty Division (Divorce) of the High Court of Justice, dated February 12th, 1934, in the case of Ferris *v.* Ferris and Ashken, in which you were the co-respondent. (2) That by reason of the said facts you abused your position as a registered medical practitioner. And that in relation to the facts so alleged you have been guilty of infamous conduct in a professional respect."

The complainant was Mr. Francis Spaul Ferris.

Dr. Ashken appeared in answer to his notice and was accompanied by Mr. Victor Williams, counsel, instructed by Messrs. G. and A. Cosens, solicitors.

Mr. Harper, opening the case, said that he could not understand on what respondent relied for his defence, as both adultery and professional relationship were admitted.

Mr. Ferris, the complainant, gave evidence showing that the acquaintance between his wife and respondent had arisen out of professional relationship. They had all three become very friendly. His wife had confessed to adultery one Sunday morning, and Dr. and Mrs. Ashken had been summoned to the house for a discussion. Respondent had flatly denied the charge at first, he had declared that it was possible for a woman in her condition to imagine such an event, and suggested that she had had intercourse with other men and was imagining that it was respondent. Complainant had told him to leave the house, and had subsequently had his wife examined by another doctor who had found her of sound mind. He had therefore asked his wife to leave the house and had instituted divorce proceedings. A little later Dr. Ashken had rung up his office and the line had been tapped and the conversation recorded. Dr. Ashken had said he wished to confess, and had later called at the office in a very distressed condition and confessed and asked forgiveness. He had eventually consented to make a written statement. (An official from the Divorce Court produced the statement and Mr. Ferris identified it.) Later respondent had met him at North Wembley station and asked if he might make a public apology in the press, but complainant had refused and had obtained a decree nisi. Dr. Ashken had broken up his home. Cross-examined by Mr. Williams, he said that his wife's moral character had been entirely satisfactory until she met respondent. He did not deny that Dr. Ashken had twice suggested he should give up the case, but denied that he had given it up or that they had ever sent for another doctor before Dr. Ashken. He agreed he had divided the blame equally between respondent and Mrs. Ferris.

Dr. Ashken, giving evidence, said that Mrs. Ferris had come to his consulting room in August, 1931, complaining of severe vaginal discharge. Friendship had developed. He had several times suggested that another doctor should take over the case, while the friendship continued, but Mr. Ferris had always refused. Adultery had been committed four times only. He bitterly repented what he had done and was much ashamed of himself.

In answer to the Legal Assessor, he admitted that he had denied adultery at the first interview.

Mrs. E. A. Ashken described two telephone conversations which she had overheard between Mrs. Ferris and her husband ; in both, Mrs. Ferris had said that Mr. Ferris would not take proceedings if she (Mrs. Ashken) would leave her husband, but she had not done so.

Sister Margaret Bethan described Mrs. Ferris's nervous condition and her infatuation with Dr. Ashken. She had nursed three or four hundred cases for respondent and his conduct had always been most professional. Miss Kathleen Sell, formerly a nurse, described Dr. Ashken's treatment of about two hundred cases in a local nursing-home as quite unobjectionable. Mrs. Ferris had been very unsatisfactory as a patient, often refusing treatment and then telephoning for the doctor to return at once. The vicar of Kenton and several patients testified to Dr. Ashken's high character and reputation and their trust in him. Dr. Arthur Whitesides, who had been Dr. Ashken's assistant for six months, declared that his conduct had been above reproach in every way, and amplified his opinion under cross-examination. Dr. J. Sakula gave evidence that he had also been assistant to Dr. Ashken and had attended Mrs. Ferris, finding her very difficult and troublesome. Dr. Samuel Halperin, formerly Dr. Whiteside's assistant, testified to the high reputation of Dr. Ashken among former patients. Mr. Williams also put in a number of statutory declarations as to character from medical men, and addressed the Council, arguing that his client had been tempted and tried beyond human endurance.

Mr. Harper addressed the Council, deploring the fact that so many responsible persons—witnesses and those sending statutory declarations—should attempt to minimise the gravity of adultery, which was admitted.

After deliberation in camera the President announced that the Registrar had been directed to erase from the Register the name of Laurence Handley Ashken.

ALLEGED ADVERTISING

The Case of James Stansfield Collier, registered as of 30, Wimpole-street, London, W.1., M.R.C.S. Eng. 1894, L.R.C.P. Lond. 1894, who had been summoned to appear before the Council on the following charge :—

> "(1) That being a registered medical practitioner you authorised and/or acquiesced in the publication in the *Observer* of Jan. 7th, 1934, of an account of an interview with you headed 'Sleeplessness : Drugs which prevent it : Safety and Danger.' (2) That you thereby advertised for the purpose of obtaining patients with a view to promoting your own professional advantage. And that in relation to the facts so alleged you have been guilty of infamous conduct in a professional respect."

The complainant was Mr. Maximilian Fourman.

Dr. Collier was accompanied by Mr. Oswald Hempson, solicitor, on behalf of the Medical Defence Union.

Mr. Fourman read his statutory declaration in the witness-box. He said he was a Russian advocate who had married a British woman and had been employed in insurance offices here. His son was physically and mentally defective and they had consulted Dr. Collier and found him unsatisfactory. The article in the *Observer* had made them think that respondent was a scientific man who knew about drugs. But for that article they would never have wasted their time consulting such a man. The next victim might be some poor English working-man who would not dare to express disapproval of a name followed by so many letters. Complainant also read the letter he had written to Dr. Collier, describing his child's case in great detail, before the consultation. At the request of the President, he then read out the article from the *Observer*.

The Registrar read Dr. Collier's reply to the letter, admitting the interview and its publication but maintaining that nothing in the article could be regarded as advertising. Mr. Fourman's son had proved to be a mentally defective epileptic who was being quite properly treated by his doctor with luminal.

Mr. Fourman addressed the Council, saying that he played the part of the man who called the fire-brigade when he saw a fire. He thought his duty would have been fulfilled by drawing the Registrar's attention to the article, and had not anticipated having to take part in proceedings. He contrasted Dr. Collier's treatment of him with the code of conduct instilled into members of the Russian Bar. He had been treated most hospitably in England and hoped Dr. Collier would not be too severely punished. Anything the Council could find in respondent's favour would cause complainant great happiness.

Mr. Hempson called Dr. Collier as a witness and Dr. Collier explained the circumstances under which the article had been written. He had granted an interview because he thought the public was getting a wrong impression of the danger of certain drugs. They were being much discussed in the lay press and many of his patients distrusted them and refused to take them, so that his treatment was handicapped. He had gone carefully over the journalist's written account of the interview and had given permission for his name to be used. The article correctly represented the interview as far as the inverted commas went. He had not authorised any setting forth of his own capacities. A proof had been submitted and called for but he had no recollection of seeing or correcting it. Mr. Fourman's account of the consultation was substantially correct; he had examined and prescribed for the boy and taken fairly full notes. He had told complainant that he should have written beforehand if he knew he could only afford one guinea. He had had one other patient as a result of the article—a hopeless drug addict—and had taken no fee, nor had he received any fee from the *Observer*. There was emphatically no idea of attracting patients; he was not in financial need of patients and had as much work as he could do. He admitted unwisdom in letting this article go through without proper scrutiny.

The Legal Assessor pointed out the opening paragraphs, not in inverted commas, and Dr. Collier said those had been added and had not been in any script seen by him. (They referred to him as a noted specialist.)

Mr. Hempson read a statutory declaration from the representative of the *Observer*, confirming Dr. Collier's account of the interview and its reasons. The maid had handed him back the draft article in its original envelope, unaltered and unsigned, saying that Dr. Collier had been unexpectedly called away. He took full responsibility for the opening paragraphs which he had added without Dr. Collier's knowledge. Mr. Hempson argued that there was no "criminal intent" in the matter. Nobody who knew respondent would think it possible that this article would be to his advantage.

After deliberation in camera the President announced that the Council had found the first charge proved, but not the second. Dr. Collier had allowed publication of an unwise article which had inevitably laid him open to these proceedings, but the Council accepted his assurances as to motive, and left the matter there.

CHARGES OF CANVASSING

The Case of Malcolm Herbert Cecil Dyson, registered as of Lyemun, St. Mawes, Cornwall, M.R.C.S. Eng. 1926, L.R.C.P. Lond. 1926, B.S. 1927, M.D. 1929, U.Lond., who had been summoned to appear before the Council on the following charge:—

> "That being a registered medical practitioner you have canvassed personally and/or by means of an agent the patients of David Morrison with a view to inducing such patients to become patients of yours, and in particular: (1) In or about the months of November, 1933, and February, 1934, you canvassed William Francis Butland; (2) in or about the month of February, 1934, you canvassed Henry Hooper; (3) in or about the early part of February, 1934, you canvassed William Henry May; (4) in or about the month of February, 1934, you canvassed James Sara. And that in relation to the facts so alleged you have been guilty of infamous conduct in a professional respect."

The complainant was Mr. David Morrison, M.B. 1894, U.Lond. Dr. Dyson was accompanied by Mr. Oswald Hempson, solicitor, for the Medical Defence Union.

Dr. Morrison opened his case, complaining of most unfriendly treatment from respondent who had, he alleged, tried to drive him out of the place and carried on the most outrageous canvassing of complainant's patients. Complainant had brought four statutory declarations but had only been able to bring two witnesses from St. Mawes. He submitted that Dr. Dyson's letter to the Registrar amounted to a confession and revealed motive, and the intention to wreck his small practice and make it unsaleable in the fear that a young, energetic man might buy it and offer the respondent serious opposition. He read his letter offering to stop proceedings if respondent would make amends and described an effort on the part of the vicar to negotiate. He read out correspondence with the local nursing association dealing with his assertion that a nurse had told a patient that respondent was "the" doctor of the association.

Dr. Morrison entered the witness-box and was cross-examined by Mr. Hempson. He said he had first gone to St. Mawes in May, 1932, as locum tenens for the deceased Dr. Murray and had carried on the practice for three months. Some days after leaving he had returned and set up in practice for himself. He had offered to purchase the practice, which was producing about £300–£350 a year. His present practice was about the same size, but that did not mean that he had secured practically the whole of that practice. He did not suggest that respondent was unfriendly during his *locum* period. He had set up in practice there because Dr. Dyson and his partner had, for a year before Dr. Murray's death, been scheming to spoil the practice of a dying man, so that the practice for which Dr. Murray had paid £1200 was only bringing in about £300 at the time of his death. Dr. Dyson and his partner had eventually bought the practice, after complainant had told them he had no intention of setting up in practice there. He admitted having received a letter from the British Medical Bureau saying that for him to set up in practice at St. Mawes would not only be contrary to medical etiquette, but also in contravention of the terms of their introduction of him as locum. He thought Miss Murray had played him a dirty trick in selling the practice to Dr. Scott and Dr. Dyson after asking him to make an offer, although he agreed his offer was a very poor one and he had not expected it to be accepted. He denied that there had been a meeting of doctors in Falmouth about his advertising methods and that the profession there had refused to recognise him. He admitted that his letter to respondent demanded amends or compensation as an alternative to these proceedings, and that the proceedings were punishment of Dr. Dyson.

The Legal Assessor asked what complainant would say in answer to the defence that Dr. Dyson had been seeking to protect his own patients rather than attract complainant's. Dr. Morrison replied that his action in starting practice at St. Mawes might have been unconventional, but he was free to set up where he liked. He agreed that he had started practice a month after Dr. Dyson and his partner had bought the practice of Dr. Murray.

Sir Henry Brackenbury asked if complainant had seen the four people named in the charge while he had been a locum. Dr. Morrison replied that they had all been Dr. Murray's patients; he could not be sure whether he had attended them or not.

William Francis Butland gave evidence that Dr. Dyson had twice approached him, asked why he was not on his (respondent's) panel, and said that Dr. Morrison had no business there. Witness had said he had no wish nor reason to change. In reply to Mr. Hempson, he said that they had shaken hands at the end and been quite friendly.

William Henry May gave evidence that Dr. Dyson had told him he ought not to be on Dr. Morrison's panel, that Dr. Morrison had no business there and would have to go, and that witness should transfer to respondent's list. Respondent had had to ask his name, not knowing him personally.

Dr. Morrison put in two statutory declarations from aged patients too ill to travel, describing similar attempts to canvass.

Dr. Dyson, giving evidence on his own behalf, said that he had looked after Dr. Murray's patients gratuitously during his illness and that he had been offered the lighthouse appointment after his death and had refused it until Dr. Murray's affairs should be settled up. As a result of the usual letter sent round by the Panel Committee after he had bought the practice, some 160 out of 315 patients had transferred to him. The panel was the most important part of Dr. Murray's practice. He admitted having seen the four patients mentioned in the charge and had spoken to them because he had made a point of telling all these people the truth. He had never attempted to persuade anybody to join his panel. There had been a strong rumour in St. Just that Dr. Morrison had bought Dr. Murray's practice, and he and Miss Murray had gone round to tell the facts. They had proposed to send round a circular letter on this point. He and his partner, Dr. Scott, had bought the practice, and the first notification they had had of Dr. Morrison's return was a letter to Dr. Scott. They had offered him the practice at the price they had paid for it, but he had refused. They had appealed to the British Medical Association and the Panel Committee, but neither had been able to help. Dr. Morrison had soon tried to sell his practice and respondent had advised an applicant to see the British Medical Association before buying it.

Cross-examined, he said that after his predecessor's death there had been an interval during which Dr. Murray had been the only doctor in St. Mawes. His only object in going round was to tell the truth, and no patients had transferred to his panel in consequence. He had taken every possible step to prevent complainant selling his nucleus.

In reply to the Legal Assessor, he agreed that he knew in November, 1932, that some 150 of Dr. Murray's former panel patients had not transferred to his panel on Dr. Murray's death and presumably did not want to. He admitted that he had been in error in not approaching these patients until November, 1933, 12 months or more after they had changed to Dr. Morrison. It was only gradually, however, that he realised that the people of the district thought Dr. Morrison had bought Dr. Murray's practice. Frankly, he had taken the law into his own hands at that stage.

Dr. F. S. Scott, Dr. Dyson's partner, said that a branch of his practice had been established in St. Mawes in 1925, before Dr. Murray had gone there, and there had been continuity of that practice ever since. Dr. Murray had introduced opposition. He had himself asked Dr. Murray's executors to put in a locum so that there might be no suggestion that they wanted to get the work for themselves. He had offered Dr. Morrison the practice at the price they had given for it and promised not to interfere with him. Until quite recently there had been a persistent belief that Dr. Morrison had bought it. Dr. Dyson and he had acted together, advisedly, as they could see no other way of righting a wrong. He had wanted to prevent Dr. Morrison from selling something he had never bought. From the first he had regarded it as their practice and not as Dr. Morrison's.

After Mr. Hempson had addressed the Council, and it had deliberated in camera, the President announced that the case was dismissed, the facts not having been proved to the satisfaction of the Council.

The Case of William Samuel Dixon, registered as of The Surgery, Fifth-street, Horden, Co. Durham, M.B., B.Ch. 1923, U.Dub., who had been summoned to appear before the Council on the following charge :—

> "That being a registered medical practitioner you have systematically canvassed during the months of February and March, 1934, in and around the district of Horden in the County of Durham, by means of an agent or agents, the patients of Dr. A. M. Wilson, Dr. G. C. Henry, and Dr. William Martin, with a view to inducing such patients to become patients of yours, and in particuler: (1) On or about Feb. 27th, 1934, you canvassed John Henry Burnham, a patient of the said Dr. A. M. Wilson; (2) on two occasions in or about the month of March, 1934, you canvassed Henry Kaye and his wife Mrs. Emma Kaye, patients of the said Dr. A. M. Wilson; (3) at the end of February or the beginning of March, 1934, you canvassed Mrs. Ethel May Rudd, a patient of the said Dr. G. C. Henry: (4) on or about March 3rd, 1934, you canvassed Kitty Tatters, a patient of the said Dr. William Martin. And that in relation to the facts so alleged you have been guilty of infamous conduct in a professional respect."

The complainants were the London and Counties Medical Protection Society, who were represented by Mr. T. Carthew, counsel, instructed by Messrs. Le Brasseur and Oakley, solicitors. Dr. Dixon appeared in answer to his Notice and was accompanied by Mr. Oswald Hempson, solicitor, for the Medical Defence Union.

Mr. Carthew explained that respondent and Dr. Wilson had been partners from 1925–1934, but negotiations for continuation had failed and the partnership had ended by effluxion of time. Respondent had set up in practice alone. All four doctors had similar practices, consisting of four types of patient: (1) panel; (2) colliery club (the families of insured men), the money being paid by the colliery; (3) private club patients; and (4) private patients. After a while the three doctors had become aware of a wholesale door-to-door canvassing campaign carried on by respondent. They had written to him about it, and he had replied that it was the only way to find out which were in fact his patients, and that the club patients had to be notified of the dissolution of partnership; he said that he had consulted a solicitor and members of the ethical and panel committee before acting, and the visitation was one of inquiry and notification only and not of canvassing. Mr. Carthew could prove, he thought, that the colliery could have been asked to supply a list of the patients of the partnership, and a circular could then have been sent to them, to fulfil the articles of partnership which required notification of dissolution to all patients. The fact was that practically every house in Horden had been visited. Dr. Wilson had had no part in or knowledge of this proceeding. It was not yet possible to tell the effect on the panel patients, but the colliery club figures showed that the former partnership had had 1390 patients, of whom 1183 had transferred to Dr. Dixon. The private club had had some 250 members, of whom only 28 had remained with Dr. Wilson.

Dr. A. M. Wilson said that he had been in practice in Horden since 1915, that respondent had come to him as assistant in 1923 and had been his partner from 1925–1934. He had known nothing of any canvassing plan. He had from time to time obtained lists of the club patients from the cashier of the colliery, and produced specimen lists. There would be no difficulty, so far as he knew, in Dr. Dixon getting a list if he had gone the right way about it. A notice of dissolution of partnership had been displayed in the surgery. He confirmed the transfer figures. Cross-examined by Mr. Hempson, he agreed that Dr. Dixon had been doing the bulk of the work of the partnership, and might be expected to get more patients than himself on its dissolution. In the absence of addresses it would be impossible to trace the patients from a list of names. He had not complained to the local ethical committee. He had sent his collector round from house to house after the dissolution to find out which patients were staying with him. He did not recall speaking to the dispenser about Dr. Dixon. Re-examined, he said he had not put much activity into the work since the death of his wife two years before the dissolution, but he had worked every day, walking his rounds. His collector had not visited at every door but only a given list of addresses.

In reply to the Legal Assessor, he said he had never applied to the colliery for a list of patients and been refused.

Dr. G. C. Henry said he had obtained lists of patients from the colliery without delay or difficulty. He produced the books, corrected by the colliery clerks. Dr. Dixon was a very active opponent. He himself had set up in practice in Horden a few months after his brother had ceased to be assistant to Dr Wilson, who had later complained to the Central Ethical Committee about witness. Dr. Dixon had been anxious to give evidence against him in that case and had later complained of witness's criticism of him to a patient. He had brought an action against Dr. Dixon and been awarded £50 damages. The panel committee had inquired into the canvassing charge and had decided that there was no case to go to the Ministry; the visits had been indiscreet if not irregular, but no attempts had been made to influence patients. Miss Wearmouth was his servant. He had prepared a statement for Kitty Tatters to sign, but it had never been signed. He admitted that Dr. Martin's partner had complained to the Ethical Committee that witness had canvassed.

Dr. W. Martin also testified to having applied for particulars from the colliery and having obtained them with ease. Cross-examined, he said that the list was a joint one between himself and partner; they received a joint cheque and the colliery had no knowledge of which patient belonged to which doctor. After the war he and Dr. Wilson had been the only doctors in the district and the lists had got rather mixed up; witness described the way the doctors had managed to sort them out. He had not employed a Mr. Edward Malone to go round visiting and inquiring.

In reply to the Legal Assessor, he said that he and his partner divided their patients into two districts, each taking one, subject to choice by the patient. A list from the colliery would be a practice list, but each partner could tell roughly which patients preferred him; the great majority did not mind which they saw. The list could not be accurately divided into two. In reply to Dr. Bone, he said the junior partner could get the list just as easily as the senior. In reply to Sir Henry Brackenbury, he said the lists supplied were fairly accurate, but not so inaccurate as to necessitate a house-to-house visitation to ascertain the patients.

Mr. Henry Kaye testified that he had been asked by Mr. Carruthers to change from Dr. Wilson to Dr. Dixon; he and his wife had refused. Cross-examined, he agreed he knew Mr. Carruthers well; on the second occasion Mrs. Herbert had also been present. He had no grudge against Dr. Dixon.

Mrs. Kaye confirmed her husband's evidence.

Mrs. E. M. Rudd also declared she had been asked to change doctors.

Mr. Carthew read a statutory declaration from a witness not present and asked leave to call a number of witnesses who had not made statutory declarations. Mr. Hempson objected, as he had had no proof of the evidence. The Legal Assessor advised the Council not to accept this evidence.

Miss L. I. Wearmouth, a domestic servant in the service of Dr. Henry, described a visit of the collector to her friend, Kitty Tatters, in her presence, Kitty Tatters being on Dr. Martin's panel. She had told Dr. Henry and signed a statement. Kitty Tatters next day had wanted to destroy the statement, as all her family were on Dr. Dixon's panel.

Dr. Dixon, examined by Mr. Hempson, said that he had started with a one-third share, increased to one-half, and under the new agreement was to have two-thirds and an assistant. He had had a very large practice and panel list. For the last four or five years he had done three-fourths and for two years five-sixths of the work. In the last year he had done all the night work and 130 confinements to Dr. Wilson's two; he had taken three hours morning and evening at the surgery where his partner had taken half an hour. The negotiations had only broken down because he had wanted the assistant to come with a view to partnership and Dr. Wilson would not agree. Very few of the patients would see a notice hung in the surgery. He had seen the clerk to the Durham Insurance Committee, who had arranged to circularise the panel patients. The private collector at his last visit to private club patients had been instructed to inform them. He had visited the colliery manager, Mr. Best, and tried to get the change-over of the colliery club patients made at the colliery office, as had been done in another case but without success. He himself had never seen a list, and if Dr. Wilson had ever received a list it was without respondent's knowledge. He had had no list himself and had seen no way of getting one but sending visitors round. He had told them to call at all the colliery houses. (About 95 per cent. of the population lived in colliery houses, council houses, and scheme houses, and were constantly changing their homes.) He had told them to ask first of all if the inhabitants were patients of Drs. Wilson and Dixon, and if the answer was No they were to leave at once. If Yes, they were to ask which doctor the patient would choose on dissolution of the partnership. They were told not to say which doctor they represented until the patient had made his choice. If the patient chose Dr. Wilson they were to pass on, as the money at the colliery was already deducted in Dr. Wilson's name. On no account were they to interfere with panel cards. Nothing was done after March 6th, as the Medical Defence Union had advised him on that day that the procedure was undesirable. His visitors had collected 510 pit notes out of the 1380 pit patients on the joint list. On the list he had received from the colliery there were names and no addresses; he had telephoned and been told that no other information was ever given. He could not ascertain all the addresses from that list. He had had no idea of attracting patients to himself; he already had more than he could deal with. He had not, to his knowledge, taken the patients of any other doctor. Relations between members of the profession in Horden had been strained ever since he had been there.

Cross-examined by Mr. Carthew, he said that Dr. Wilson had refused to discuss with him at all how he should notify the patients. It had never occurred to him that his agents might exceed his instructions and he had heard his patients say the method had been adopted before. In reply to the Legal Assessor, he said he had not consulted Dr. Wilson about the list as the partnership had by then been dissolved. In reply to Dr. Bone, he agreed that the colliery club patients were dependents of miners who were panel patients and whose addresses ought to have been found on the panel cards. The visitors had not brought back any panel cards. In reply to the President, he said that about 40 per cent. of the circulars sent out by the panel committee had been returned "not found in the village," owing to the frequent changes of address, and many patients had confessed to having received the circulars and not understood them.

Mr. E. Best, manager of the colliery, described Dr. Dixon's visit to him. The patients of Drs. Wilson and Dixon were all under the name of Dr. Wilson. Dr. Dixon had asked witnesses to let the workmen inform the office which doctor they wanted; witness had refused lest the colliery be accused of influence. A list of names without addresses had been furnished to Dr. Dixon. It was the custom to supply the doctors with names and addresses, but Dr. Dixon had been told that the work of searching for the addresses would take the office staff about a month. About 75 per cent. of the houses belonged to the company, which could move the people about so that large families had large houses, and they were being moved about all the time. If the doctors sent in their own lists the colliery would keep them up to date, but this partnership had not followed that practice. It was not the custom of the coalfields generally to supply addresses.

Mr. V. Williams, one of the visitors, testified that Dr. Dixon's instructions had been as Dr. Dixon had stated and that they had been expressly forbidden to use any influence or persuasion. He had visited between March 2nd and 6th only. He had been given an area to visit and had done nearly the whole of it, except that in a number of houses he had found no one at home. He had had nothing to do with panel cards and had never tried to persuade people to come to Dr. Dixon. He described his visit to the Tatters's, declaring that Mrs. Tatters's daughter had mentioned the panel cards and he had refused to have anything to do with them. He had not asked her if she would like to be on Dr. Dixon's panel. Cross-examined by Mr. Carthew, he said he had been a club collector for many years, paid by commission. He knew many people in Horden pretty well, but had not stopped to chat at the houses. He had carried out his work conscientiously and without bias. In reply to the Legal Assessor, he said he had not called at any house if he knew the inhabitants were patients of other doctors; those had been his instructions. He had given in his reports each night. He had not been paid for the work.

Re-examined, he explained that his commission was on private club patients only, not colliery club patients.

Mr. C. Knox, another visitor, gave similar evidence, as did Mr. R. Carruthers and Mr. F. Glaister, who said in cross-examination that they had acted without payment out of gratitude to Dr. Dixon.

Mrs. Mary Ann Finlay testified that Mr. Carruthers had called at Mr. Kaye's house but had seen only Mrs. Kaye. He had merely asked her with which of the two doctors she intended to continue.

Miss Katherine Tatters corroborated Mr. Williams's evidence, and said that Miss Wearmouth had asked her to sign a statement which was false in every respect, especially in that it said that Mr. Williams had offered to make it easy for her to change over to Dr. Dixon's panel.

Mr. Hempson summarised several more statutory declarations corroborating the earlier evidence. In addressing the Council, he admitted that Dr. Dixon had done a most unwise thing in sending collectors to all the houses in the district, but not a heinous thing, for they had only been told to inform partnership private patients of the dissolution and ask to which of the partners they wished to adhere. He put in statutory declarations to character and a petition signed by a large number of the inhabitants of the district.

After deliberation in camera the President announced that the facts had been proved to the satisfaction of the Council, but judgment had been postponed until May, 1935, when respondent would be required to attend and to produce evidence of his conduct in the interval.

ALLEGED MISCONDUCT

The Case of Mortimer McGhee Russell, registered as of Sideways, Higher Green, Ewell, Surrey, M.B., B.Ch. 1916, M.D. 1920, U.Dub., who had been summoned to appear before the Council on the following charge:—

"(1) That being a registered medical practitioner you committed adultery with Violet Rosetta Smith, a married woman, who and whose family you had attended professionally, of which adultery you were found guilty by decrees of the Probate, Divorce and Admiralty Division (Divorce) of the High Court of Justice, both dated Jan. 29th, 1934, in the case of Russell v. Russell, in which you were the

> respondent, and in the case of Smith v. Smith and Russell, in which you were the co-respondent. (2) That by reason of the said facts you abused your position as a registered medical practitioner. And that in relation to the facts so alleged you have been guilty of infamous conduct in a professional respect."

There was no complainant in this case.

Dr. Russell was accompanied by Mr. Herbert Malone, counsel, instructed by Messrs. Lawrance, Messer and Co., solicitors. Mr. Harper said that the facts under (1) were admitted, but (2) was denied on the ground that professional relationship had ceased in August, 1931, and the association leading to adultery had not started until May, 1933. He put in the decree and the shorthand notes from the Divorce Court, pointing out that Mrs. Russell had complained in 1931 and been assured there was nothing but friendship between respondent and Mrs. Smith, and that her husband had left her in 1932.

Mr. Malone set out the facts chronologically. Respondent had graduated in 1915, entered the R.A.M.C., and married in 1923. Almost from the beginning both Dr. and Mrs. Russell had realised that it was a very unfortunate mating. Mrs. Russell was so consumed with jealousy that neither man nor woman could be entertained socially in their house without a quarrel. Mrs. Smith had been a patient of the partnership and respondent had seen her three or four times a year. In November, 1930, she had had appendicitis and been operated on by Dr. Dainty, assisted by Dr. Russell. At that time she had been merely a rather troublesome patient. In 1931 she had been attended by Dr. Russell for miscarriage, July 6th–24th, and he had never attended her again. Respondent had gone to her husband, told him that Mrs. Smith was getting no benefit from his treatment as she would not obey him, and recommended another doctor, who had then taken over her case. She had disliked that doctor, and in October Dr. Dainty had communicated in the ordinary professional way with respondent saying that Mrs. Smith wished to become his patient, which she remained to this day. Respondent had tried to arrange a separation, but his wife had said "divorce or nothing." On his wife's suggestion in 1932 he had picked up a woman in order to give cause for divorce, and a petition had been filed in October, 1932, and come into the list in January, 1933, but before its hearing Dr. Russell decided to persuade his wife to try again. They had done so, but had again failed and separated. He had met Mrs. Smith by accident in December, 1933, not having seen her since July, 1931. She had then told him for the first time that she was unhappy and they had exchanged confidences. Some months later she had telephoned him and they had become friendly. He had made another unsuccessful attempt to become reconciled with his wife after that. Respondent proposed to marry Mrs. Smith as soon as the divorce decree was made absolute. He had not practised at all for 12 months.

Dr. Russell confirmed his counsel's account of the facts. Cross-examined, he admitted meeting Mrs. Smith and her husband casually in the street several times between 1931 and 1933. In 1932 Mrs. Russell had been complaining about everything under the sun, and had objected to his alleged intimacy with a dozen women, including Mrs. Smith. He had probably said there was nothing in it, but had not said there was friendship. In reply to the Legal Assessor, he said he had left Sutton in October, 1932, and Mrs. Smith had continued to live there. After that time he had not seen nor communicated with Mrs. Smith.

Dr. R. Dainty also confirmed the facts as set out by Mr. Malone. In October, 1931, Mrs. Smith had come to him asking if he would take her on as a patient and he had been attending her ever since. He had left Sutton in September, 1933, but she had continued to visit him. Counsel's description of Mrs. Russell had been quite an accurate one.

The President announced, after deliberation, that the facts alleged had not been proved to the satisfaction of the Council.

(To be continued)

NOTES FROM INDIA

(FROM A CORRESPONDENT)

BIOCHEMICAL TESTS IN CIRRHOSIS OF THE LIVER

A BIOCHEMICAL investigation of the blood in 53 patients admitted to the King George Hospital, Vizagapatam, South India, for cirrhosis of liver has recently been carried out by Dr. M. V. Radhakrishna Rao in the pathological department of the medical college to which the hospital is attached.[1] He found the fasting blood-sugar to be low in most of the cases of hepatic cirrhosis, the average being 78·24 mg. per cent., whereas the average fasting blood-sugar of normal Indians is 117·0 mg. per cent. He attributes the low blood-sugar to an impairment of the "glycogenetic and glycogenolytic functions" of the liver. No symptoms of hypoglycæmia, however, have been observed, even though in some cases the blood-sugar is less than 60·0 mg. per cent. The blood-urea in these cases was mostly within normal limits or rather higher, and only rarely fell to a low level; Dr. Rao takes this to indicate that the "ureogenetic function" of the liver is not usually deranged—even in advanced stages of hepatic cirrhosis. The non-protein nitrogen and the creatinine are also within normal limits or on the high side. The plasma cholesterol was low in most of the cases, but it is not certain whether this is due to the destruction of the hepatic parenchyma or to the diet of the patients, which was poor in cholesterol and fats.

DR. RANGACHARI

The death occurred in Madras on April 24th of Dr. S. Rangachari. Dr. Rangachari, who was born in 1882, joined the Madras Medical Service in 1905 after a brilliant college career. He worked at various hospitals before he became a district medical and sanitary officer in 1914–15. He then became interested in obstetrics and gynæcology and was made assistant superintendent of the Government Maternity Hospital, Madras, in 1919, a post which he held in addition to that of surgeon of the General Hospital, Madras. In 1926 he retired from Government service and started a private nursing-home with well paid assistants and an adequate nursing staff in the Southern Presidency, where he did valuable work in the training of post-graduates who were allowed access to the patients in the capacity of assistants. Dr. Rangachari had exceptional surgical skill and clinical judgment, and his loss as a teacher will be widely felt.

TYPES OF MENINGOCOCCI IN CALCUTTA EPIDEMICS

Dr. A. K. Sen and his collaborators in Calcutta have published (Jour. Indian Med. Assoc., March, 1934, p. 288) a preliminary report on the bacteriology of the epidemic of cerebro-spinal fever which occurred in Calcutta at the end of last year. Altogether 42 different strains of meningococcus were isolated, of which 35 were typed by agglutination tests with the standard type sera. They found that during the period when these investigations were in progress the epidemic strains belonged mostly to type I., type III., or "type I. or III." of the Gordon-Murray types; not one of the 35 strains belonged to type II., type IV., or "type II. or IV." These results differ from those obtained by B. Sen in Calcutta in the epidemic of March and April, 1932; he incriminated mainly type IV., and found some strains of type II. It is possible that the virulent strains are different in different epidemics, but it is also noteworthy that the strains in 1932 were collected at the height of the epidemic, and that in 1933 they were collected when the epidemic had subsided.

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[1] Jour. of the Ind. Med. Assoc., 1934, iii., 219.

FAR EASTERN ASSOCIATION OF TROPICAL MEDICINE

The ninth congress of this association will be held in Nanking, China, on Oct. 1st–7th, 1934. This association is an international organisation of medical, surgical, dental, and veterinary professional men interested in research and in the prevention of tropical diseases in the Far East. The seventh congress was held in Calcutta, and the eighth in 1930 in Bangkok. Among the vice-presidents of the congress are Major-General J. D. Graham, I.M.S., representing the Government of India; Lieut.-Colonel J. Morison, I.M.S. (Assam); Lieut.-Colonel A. D. Stewart, I.M.S. (Bengal); Lieut.-Colonel F. P. Mackie, I.M.S. (Bombay); Colonel C. A. Gill (Burma); Sir Frank Connor (Madras); and Lieut.-Col. H. H. Nutt (United Provinces), and official delegates from many parts of India are expected to attend the congress.

OBITUARY

MORGAN IGNATIUS FINUCANE, L.R.C.P., M.R.C.S.

We regret to announce the death of Dr. Morgan Finucane, which occurred on May 31st at his country house, Seddlescombe, Sussex.

Morgan Ignatius Finucane was born in the Island of Ascension in 1865, the son of Dr. Daniel Finucane, an Inspector-General R.N. He was educated at the Royal Naval School, New Cross, and received his professional training at the medical schools of University College and St. Thomas's Hospital. He commenced practice in the Colonial Service, and was in succession medical officer to the Fiji Islands, medical superintendent of the Suva Hospital, and surgeon to the Victoria Hospital, Bathurst. In both colonies he acted as a stipendary magistrate, and in both, especially in Fiji, he studied the diseases of the country and their incidence upon the inhabitants, and published articles on yaws and elephantiasis from his personal observations. After 12 years with the Colonial Office he served in South Africa during the war, became civil surgeon to the R.A.M.C. at Aldershot and at the Tower of London, and also one of the medical officers to the Western Dispensary, Rochester-row. He was now appointed poor-law medical officer to the city of Westminster and did admirable work here as official, as doctor, and as philanthropist. He was for 27 years in charge of the workhouse and casualty wards, earning a high reputation for his keenness and sympathy, and becoming through his experiences with the unfortunate a reforming radical in politics.

He was called to the Bar at the Middle Temple and later acquired considerable practice as a consultant in medico-legal work. He was elected a member of the L.C.C., and served in several important capacities—e.g., as a member of the following committees, those of general purposes, children's care, and special schools. He was a manager of the old Metropolitan Asylums Board, and in 1914 was adopted as Liberal candidate for Westminster, but later joined the Labour party. He served on the Home Office Committee on delinquents and on the Lord Chancellor's Advisory Committee for the appointment of magistrates for the County of London, and has left his mark as an untiring worker both in social and political directions.

FRANKLIN JOHN LIVINGSTONE, M.D. Toront.

Franklin John Livingstone was born in 1863 at Collingwood, Ontario, and graduated in medicine at Toronto. In 1895 he settled at Ladysmith as a medical practitioner, at the same time taking up missionary work for the Canadian Methodist Church. He was appointed district surgeon at Ingwavuma, Zululand, where he was in practice until the Boer war broke out. He was captured by the Boers, but made his escape, and for a time returned to Canada, where in 1901 he married Miss Sarah Gardiner, of Kingston, who returned with him immediately to Natal. He saw active service in the Zulu Rebellion of 1906, and was awarded the Queen's Medal. He now took up practice at Pomeroy, and, later, became district surgeon of Bulwer. In 1915 he returned to Ladysmith, and remained there for eight years, having a large native practice, and carrying on farming very successfully. In 1921 he took up his residence at Port Shepstone, where he died. Dr. Livingstone had been a noted athlete as a young man and was also a fine horseman and tennis player. He is survived by his wife, a son, and a daughter.

DR. JAMES TAYLOR

LATE PROVOST OF KEITH

Dr. James Taylor, whose death was lately announced, was well known in many public capacities. He was born in New Deer, Aberdeen, in 1860, the son of Alexander Taylor, and was educated at the Grammar School and University of Aberdeen. He graduated as M.A. in 1880, and M.B., C.M. in 1883. He proceeded to the M.D. in 1887, and at the Aberdeen Royal Infirmary held the house appointments, becoming later clinical tutor in the medical school. On entering practice at Keith he filled many positions of local importance, was medical referee to the Home Office under the Workmen's Compensation Act, medical officer for the Post Office, medical superintendent of the Memorial Hospital, and examiner for recruits for the Army. With the rank of Major R.A.M.C. (T.F.) he did considerable local service during the war, was president of the Pensions Board at Keith, received the medal of the British Red Cross Society, and was made an honorary life member of the St. John Ambulance Association. He was J.P. for the county of Banffshire, acted as Sheriff's substitute, was provost of Keith from 1913 to 1919, and was a deputy lieutenant of the county.

CORBETT HOSPITAL.—On Saturday last Lord Cobham, the president, opened extensions of the hospital at Amblecote, Worcestershire, consisting of two new wings and a nurses' home, the first stage of a scheme for the provision of a new hospital. The cost of the whole scheme, including equipment, is estimated at £105,000.

PUBLIC HEALTH

The Drought

SPEAKING last week at Swindon, Sir Hilton Young described the measures which were being taken by the Government to relieve the situation caused by the drought. He was arranging for a standing conference of the three representative bodies—the British Waterworks Association, the Institute of Water Engineers, and the Water Companies Association—to act in coöperation with the Ministry, in order to bring to bear upon remedial measures all the available knowledge and experience of the experts and of those actually responsible for water-supplies. He had also appointed a special officer of the Ministry to promote the formation of regional water committees. Applications for grants under the emergency Act made it certain that the £1,000,000 would be promptly and usefully employed and would secure a real improvement in the rural areas most in need of it. The capital value of schemes already submitted exceeded £800,000.

Mental Disease and Defect in London

At the end of 1932 there was provision in L.C.C. mental hospitals, under the Lunacy and Mental Treatment Acts, for 21,760 patients.[1] The demand for accommodation is increasing and schemes are in hand for meeting it, but it is not due to increased incidence of mental disorder (the tendency is in fact the other way) but to the accumulation of chronic patients who cannot be discharged. Only 177 of the 21,760 inmates were voluntary patients, but it is significant that at the Maudsley Hospital—which is now in its eleventh year of voluntary treatment of early cases—2070 out-patients were registered during the year, while 1109 were under treatment at the end of it. Of 672 in-patients discharged in 1932 from the Maudsley Hospital 88 are described as "recovered" and 331 as "relieved." Similar treatment is also available at three general hospitals under the public health committee. It may be expected that the number of voluntary cases will continue to increase.

Of mental defect 774 new cases were reported in 1929, 1796 in 1930, 2053 in 1931, and 1006 in 1932. This large increase, the peak of which has been passed, was more apparent than real, as it was largely due to the transfer of cases from poor-law authorities after the passing of the Local Government Act. For instance, 809 out of the 1006 reported in 1932 were in transferred mental institutions or in London mental hospitals. The increase thus represents the advance in ascertainment which unified control is gradually making possible. The total number of defectives at the end of 1932 ascertained by the L.C.C. to be dealt with under the Mental Deficiency Act represented a proportion of 3·65 per 1000 of population, less than half the proportion of defectives estimated in the Wood report. The discrepancy suggests that an undue proportion of defective children discharged from special schools are not yet being notified under the provisions of the Act. Of the 3272 defectives under statutory supervision 969 are employed, a fair proportion when it is remembered that those supervised must in the main be low-grade cases. There is little or no indication in the report of the nature of the training given at the various institutions, but that the possibilities of socialisation are not lost sight of is shown by the fact that at the end of the year 329 cases were on licence with a view to ultimate discharge, a proportion of 1 to 11 of the total number in institutions as compared with 1 to 9½ in 1931. Eleven per cent. however of the cases on licence in 1932 failed to make good.

More School Nurses

Addressing a conference of head teachers, Dr. R. H. Parry, medical officer of health for Bristol, advocated an increase in the number of school nurses. The usual plan now, except for a few specialised or residential areas, is for each nurse to have the care of a group of schools, sometimes a considerable distance apart. Dr. Parry would like to see a health nurse attached to every school and in close touch with the head teacher. The nurse is thus always on the spot ready to examine any child brought to her by the teacher; the child can then if necessary be sent home forthwith for the advice of the family doctor, or to the appropriate clinic or hospital. The nurse can decide whether or not to exclude a child from school, at least provisionally, in a way that is not possible for the teacher. Experience has shown that in certain matters the accuracy of the school nurse's opinion is remarkable; for instance, in a series of difficult ringworm cases J. Kerr found the nurse's errors to be a bare 3 per cent. In scabies her opinion is almost as good, and for the presence of nits it is practically infallible. In the exceptional schools with a nurse attached she often deals with minor accidents and ailments such as conjunctivitis, blepharitis, otorrhœa, and skin conditions. It is in conditions such as these that Dr. Parry finds home treatment so unsatisfactory. Even in the few instances where the parents seek the advice of their own doctor they seldom carry out instructions. For impetigo ointment is given with advice on the proper procedure, but the vital point, the removal of crusts, is overlooked with the result that an absence of 60 days may be due to this trivial cause. When such conditions are treated by a nurse the loss of school attendances is reduced to a few days. Another function which a whole-time nurse can perform is to see that children with orthopædic, cardiac, visual, and other disabilities are kept to the restrictions which medical authority has specified. Speaking to an audience of teachers, Dr. Parry naturally refrained from mentioning how much such supervision is needed; but the fact is that, although most teachers are helpful, there are still examples of myopes subjected to inappropriate conditions. The school nurse can maintain a high standard in the lavatories and washrooms; school meals and their conduct should not be outside her province. Dr. Parry regrets that a child is medically examined only three times in its school career, but he does not advocate more examinations "if the school nurses are increased in number and utilised to better purpose." If the nurse is to be of much use in observing the children and bringing forward all those who need further investigation she must have a more limited number of children under her charge. The gain from having a nurse to each school is so great that it is surprising that the practice is so unusual.

Birth Control Advice at Clinics

In 1931 the Ministry of Health sanctioned the establishment by local maternity and child welfare authorities of clinics for women in need of medical advice and treatment for gynæcological conditions, where advice on contraceptive methods might be given to married women in whom pregnancy would be detrimental to health. The departmental committee, reporting in 1932, considered that advice and instruction in contraceptive methods should be readily available for women suffering from organic disease such as tuberculosis, heart disease, diabetes, or chronic nephritis, in which childbearing is likely seriously to endanger life. It is admitted that there is nothing in law to prevent a local authority from rendering such a clinic available for women suffering from sickness other than gynæcological. In a circular (No. 1408) just issued the Ministry expresses agreement with the committee's view that contraceptive advice would be proper also for married women suffering from such forms of sickness, physical or mental, as are detrimental to them as mothers, if it is found medically that pregnancy would be detrimental to health. What is, or is not, medically detrimental to health is left to the professional judgment of the practitioner in charge of the clinic.

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[1] London County Council. Annual Report for 1932. Vol. VI. No. 3011. London: P. S. King and Son. 1s.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED MAY 26TH, 1934

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 2 (last week 4); scarlet fever, 2308; diphtheria, 977; enteric fever, 19; acute pneumonia (primary or influenzal), 954; puerperal fever, 52; puerperal pyrexia, 119; cerebro-spinal fever, 24; acute poliomyelitis, 6; acute polio-encephalitis, 1; encephalitis lethargica, 5; dysentery, 4; ophthalmia neonatorum, 71. No case of cholera, plague, or typhus fever was notified during the week.

The number of cas [illegible] Hospitals of the London County Council on [illegible] follows: Small-pox, 5 under treatment, 0 [illegible] t week 9 and 0 respectively); scarlet fev [illegible] 1689; measles, 2160 (last week 2363); [illegible]; puerperal fever, 31 mothers (plus 11 babies); encephalitis lethargica, 259; poliomyelitis, 2; "other diseases," 141. At St. Margaret's Hospital there were 15 babies (plus 5 mothers) with ophthalmia neonatorum.

Deaths.—In 121 great towns, including London, there was no death from small-pox or enteric fever, 52 (16) from measles, 11 (1) from scarlet fever, 29 (8) from whooping-cough, 41 (13) from diphtheria, 49 (9) from diarrhœa and enteritis under two years, and 32 (4) from influenza. The figures in parentheses are those for London itself.

Liverpool and Newcastle-on-Tyne each reported 5 fatal cases of measles, Acton [illegible] other great town more than 2. Birming [illegible] from whooping-cough; Merthyr Tydfil 3 [illegible]

The number of stillbirths notified during the week was 248 (corresponding to a rate of 41 per 1000 total births), including 35 in London.

THE BIRTHDAY HONOURS

THE list of honours conferred by the King on his 69th birthday contains the following names of members of the medical profession:—

K.C.M.G.

Ambrose Thomas Stanton, C.M.G., M.D.
Chief medical adviser, Colonial Office.

G.C.V.O.

Sir Milsom Rees, D.Sc., F.R.C.S.
Laryngologist, T.M. the King and Queen.

K.C.V.O.

Maurice Alan Cassidy, C.B., M.D.
Physician extraordinary to H.M. The King.

K.B.E.

Frederick Grant Banting, M.D., D.Sc.
Joint discoverer of insulin.

Knights Bachelor

Major Robert George Archibald, C.M.G., D.S.O., M.D., R.A.M.C.
Director, Wellcome Tropical Research Laboratories, Sudan.

Rai Bahadur U. N. Brahmachari.
Medical practitioner, Bengal.

G. H. A. Comyns Berkeley, M.D., F.R.C.P., F.R.C.S., F.C.O.G.
Director, L.C.C. Radium Centre, Hampstead.

Major-General James Drummond Graham, C.B., C.I.E.
Late public health commissioner, Government of India.

Grafton Elliot Smith, M.D., F.R.C.P., F.R.S.
Professor of anatomy, University of London.

C.B. (Military)

Major-General P. H. Henderson, D.S.O., M.B.
Director of hygiene, the War Office.

Major-General Ernest Alexander Walker, M.B., F.R.C.S., I.M.S.
Director of medical services, India.

C.B. (Civil)

Rear-Admiral Percival Thomas Nicholls, M.R.C.S.

C.I.E.

Lieut.-Colonel Harold Holmes King, M.B., B.S., I.M.S
Director, King Institute, Guindy, Madras.

Lieut.-Colonel John A. S. Phillips, L.R.C.P., L.R.C.S., D.P.H., I.M.S.
Director of public health, Bihar and Orissa.

C.V.O.

Louis F. R. Knuthsen, O.B.E., M.D.

C.B.E. (Military)

Group Captain Edward Cecil Clements, O.B.E., M.R.C.S.

C.B.E. (Civil)

John Crosthwaite Bridge, F.R.C.S., D.P.H.
Senior medical inspector of factories, Home Office.

William Henry Peacock, M.B., B.Sc.
Deputy-director, health services, British Nigeria.

O.B.E. (Military)

Colonel Walter Lister, T.D.
Late assistant director, medical services, West Riding.

O.B.E.

Harry Edward Hewitt, M.D., B.S., D.P.H.
Second medical officer, G.P.O.

George MacLean, M.B.E., M.B., Ch.B.
Sleeping sickness officer, Tanganyika.

Miss Katherine Stewart Macphail, M.B.
Surgeon and superintendent, Children's Hospital, Belgrade.

Khan Bahadur K. Abdul Rahman, M.B., D.P.H.
Director of public health, Punjab.

M.B.E. (Military)

Flight-Lieutenant Francis W. P. Dixon, M.B.

M.B.E.

Joseph A. H. André, M.R.C.S., L.R.C.P.
Superintendent, Leper Asylum, Mauritius.

Yusuf Hajjar, M.D.
Medical officer, Government Hospital, Jerusalem.

Andrew Buchanan Macdonald, M.B., Ch.B.
Working at leprosy, Nigeria.

Major Frank Hermann Otto, I.M.S.
Assistant surgeon, Port Health Staff, Bombay.

Joseph L. D. Pawan, M.B., Ch.B.
Government bacteriologist, Trinidad.

Sowani Puamau.
First native medical practitioner, Gilbert and Ellice Islands Colony.

Geoffrey Osmund Schmidt, I.M.S.
Assistant surgeon, British Consulate, Kashgar.

Kaisar-i-Hind Medal

Miss Doris Louisa Graham, M.B., B.Ch.
Medical missionary, Krishnagar, Bengal.

Miss Millicent Vere Webb, L.R.C.P.
Chief medical officer, Women's Medical Service for India.

CORRESPONDENCE

OLIGURIA AND ŒDEMA

To the Editor of THE LANCET

SIR,—During the last ten or twenty years there has been an increasing tendency to minimise the rôle of the kidney in the causation of œdema. The term "extrarenal" has been forced more and more into prominence, and the decreased colloid osmotic pressure of the blood caused by diminished plasma protein content has become the current explanation of the œdema of Bright's disease.

This explanation, for which Epstein is largely responsible, is an unsatisfactory one for several reasons, the two main ones being that it cannot account for the œdema of acute nephritis (for the plasma proteins are not diminished at that stage), and that variations in plasma protein do not precede, or correspond with, variations in the amount of the œdema or the amount of urine secreted. (McClure and others.[1]) It must be admitted that in long-standing cases of pronounced œdema in renal disease (subacute nephritis and nephrosis) the total plasma protein is almost always found to be below 5 per cent., and in my opinion there is little or no doubt that the diminished oncotic pressure will *favour* and *increase* the occurrence of œdema and oliguria. But as it is manifestly absurd to say that the œdema of acute nephritis and that of subacute nephritis are caused by two totally different mechanisms, it is necessary to look for some factors common to both conditions.

In your issue of May 26th Prof. Shaw Dunn suggests that the modern theory of renal secretion (Cushny) can be made to explain the œdema of renal disease, and that the oliguria is most probably dependent upon excessive reabsorption in the tubules from a glomerular filtrate which originally may be normal in amount. This would account for the fact that water and chlorides are retained while urea is excreted. I fully agree with this view, but arrived at it through a totally different process of reasoning[2] from a consideration of the important work of Verney[3] and Winton,[4] which Prof. Shaw Dunn does not appear to have taken into consideration. These workers, following up the experiments of Rose Bradford, have formulated the law that *the composition of the urine depends upon the rate of its secretion.* If the arterial pressure is lowered or the venous or ureteric pressure increased, the filtration pressure in the capsule is reduced, with the result that the urine is secreted more slowly, there is more opportunity for reabsorption in the tubules, and the resulting urine is concentrated and of relatively high specific gravity. If in a pair of kidneys the arterial pressure of one is reduced, and the venous or ureteric pressure of the other is increased, to such an extent that the rate of secretion of urine in both kidneys is equal, the composition of the two urines is the same (as regards chloride and urea content) though proteinuria usually occurs if the venous pressure is raised. Verney also refers to the reserve forces of the kidney, the first line of defence being the *structural reserve*, all the available nephrons being called into action at the same time; the second line being the *functional reserve*, when the intraglomerular pressure is raised (usually with a coincident rise of blood pressure) the rate of secretion is increased and the composition of the urine becomes correspondingly dilute. This latter response is what happens in chronic nephritis and all varieties of renal failure, characterised as they are by polyuria and low specific gravity.

Verney and Winton's work can thus be used to explain the type of urinary secretion existing in all kinds of renal disease, by changes in glomerular pressure, and it must be admitted that such changes in pressure are at any rate probable, if unproved. In acute nephritis, for example, the glomerular obstruction leads to slow secretion, increased reabsorption, oliguria, increased specific gravity, and œdema. Nitrogen-retention is prevented by the structural reserve except in the most severe cases. In subacute nephritis the same conditions may exist, and, in addition, the extrarenal factor of plasma protein loss will increase the œdema at this stage. In nephrosis glomerular obstruction being absent and ureteric pressure presumably unaffected, it is tempting to fall back on increased venous pressure as a possible cause of the slow secretion and consequent oliguria. This would at the same time account for the albuminuria. The extremely important evidence now added by Prof. Shaw Dunn, that the glomerular vessels in nephrosis are abnormally patent, is further proof here of the calling-out of the structural reserve, and is surely compatible with, if not even confirmatory evidence of, increased venous pressure. On the other hand, the swelling of the tubules might have an effect equivalent to raising the ureteric pressure. Subacute nephritis and nephrosis probably overlap in all their functional pathology, the one being merely the extreme form of the other. Plasmaprotein loss will be a factor in each.

In chronic nephritis, where œdema has disappeared or has been absent from the start, the functional reserve is eventually called out, the glomerular pressure rises, the urinary secretion becomes rapid, and the specific gravity falls. But this stage would not be reached until the structural reserve was used up and many nephrons were out of action. Therefore nitrogen-retention will eventually occur. A further proof that Verney's law still holds good, and that the specific gravity of the urine is now low merely because the secretion-rate is high, is seen sometimes at the end of chronic nephritis (or more often of nephro-sclerosis). Heart failure occurs, *the blood pressure falls,* the high glomerular pressure fails, the secretion of urine becomes less, *the specific gravity rises,* and œdema (of cardiac type) appears. The damaged kidney, able, perhaps, still to eliminate by the aid of its functional reserve now becomes totally inadequate and uræmia overtakes the patient before heart failure has run its full course.

Assuming then that the kidney in disease continues as far as possible to obey Verney's law of secretion, one may go so far as to say that if in nephritis, oliguria and high specific gravity exist when not required to do so by the needs of the body, then a pathological reduction of filtration pressure in the glomerulus may be assumed to have occurred, and reabsorption of fluid in excess of the body's requirements will of necessity take place. As an illustration of the possible events, the following purely hypothetical figures may be given :—

1. Normal kidney; 2/3 of total nephrons active; 50 litres of glomerular filtrate; 48½ reabsorbed = 1500 c.cm. urine.

2. Acute and subacute nephritis, and nephrosis; *all* nephrons active; still only 50 litres of filtrate (owing to reduced glomerular pressure); 49½ reabsorbed (owing to slow secretion) = 500 c.cm. (concentrated) urine. Non- or low-threshold substances would be excreted

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[1] McClure, W. B., de Takáts, C. B., and Hinman, W. F.: Arch. Int. Med., 1933, li., 819.

[2] Platt, R.: Nephritis and Allied Diseases, London, 1934.

[3] Verney, E. B.: THE LANCET, 1929, i., 539; 1930, ii., 63.

[4] Winton, F. R.: Jour. of Physiol., 1931, lxxi., 381; 1931, lxxii., 49 and 361.

as before because the amount of filtrate is the same, but a litre of saline solution is retained.

3. Chronic nephritis, nephro-sclerosis, &c.; only half of total nephrons left; 50 litres of filtrate still produced (by high pressure, rapid secretion); only 47½ reabsorbed = 2500 c.cm. dilute urine. Still no nitrogen retention, but polyuria and thirst present.

4. Advanced chronic nephritis, &c.; only quarter of total nephrons left; 30 litres of filtrate produced; 28 reabsorbed = 2000 c.cm. dilute urine. Nitrogen-retention now present owing to reduction of total filtrate, despite polyuria.

5. Superadded heart failure. A quarter of total nephrons now only produce 15 litres of filtrate (owing to fall in pressure): 14¾ are reabsorbed = 250 c.cm. of *concentrated* urine. Uræmia rapidly terminates the illness.

Certain other facts can be considered with interest in relation to these hypotheses. For instance, the old theory that the kidney of chronic nephritis has *lost* the power to concentrate is disproved by observation of the specific gravity in a terminal case with heart failure. The question also arises: is the œdema of heart failure itself (without significant renal disease) not due to the slow renal circulation and relatively high venous pressure in the kidney, instead of to a high pressure in the general venous circulation as ordinarily accepted? The difference in distribution of renal and cardiac œdemas has always been looked upon as proof of their different origin, but would it not be fair to suppose that if renal œdema occurred in a patient with an already high general venous pressure, retained fluid would accumulate in the dependent parts where that pressure was highest? Even in long-standing cases of renal œdema the distribution comes eventually to be almost entirely in the dependent parts, and only in acute nephritis, where fluid rapidly accumulates, is the distribution practically independent of the laws of gravity. Thus the general increase of venous and capillary pressure in heart failure may come to be looked upon as a secondary factor in the production of œdema, just as in nephrosis the low plasma protein content is a secondary factor, the primary and important factor in each case being the increased reabsorption of fluid in the renal tubules owing to the slow rate of glomerular filtration.

On any theory it is difficult at present to explain the absence of œdema in most recorded cases of total anuria (latent uræmia). Even when anuria occurs in the course of acute nephritis it is not necessarily in the most *œdematous cases.* But here a distinction may possibly have to be drawn between fluid which has been reabsorbed in excess and fluid which has in effect never reached the kidney at all. In the first place the kidney has done its work, though badly, and the fluid returned to the blood stream appears to be stored up in the tissues. In the second the fluid appears to be retained in the blood as if seeking elimination. The fact that in total anuria *all* the electrolytes are retained may also be a factor of importance.

Prof. Shaw Dunn's demonstration of the extraordinary extent to which a *small loss of albumin* in the glomeruli may become concentrated on its way through the tubules again upholds the possibility of vascular changes in the glomerulus, either "stasis with slight dilatation" as he supposes, or increased venous pressure, which amounts to practically the same thing and has been shown experimentally to produce albuminuria. That the albuminuria is more likely to depend on such changes than upon the prolonged action of toxins or changes in the nature of the plasma protein is suggested by the extreme rapidity with which it may clear up in certain cases. Kerridge's [5] work, on the nature of proteinuria in nephritis, if confirmed in cases of nephrosis, will finally dispose of the theory that the plasma albumin has undergone some change which renders it foreign to the organism and is being excreted.

As Prof. Shaw Dunn truly says, "it is obviously impossible at the present time to submit completely verified facts in support of every contention," but if reasoned argument on the basis of the accepted theories of renal secretion drives one to the conclusion that in certain pathological states œdema would be expected to occur, and if one finds on clinical examination that these are the precise states in which œdema does occur, it is a welcome relief to discard such vague phrases as "metabolic disturbances" and "increased vascular permeability," neither of which conditions are known to exist in renal disease, or are capable of demonstration at the present time.

I am, Sir, yours faithfully,

Sheffield, May 30th. ROBERT PLATT.

ACUTE HÆMOLYTIC ANÆMIA

To the Editor of THE LANCET

SIR,—The case of the boy, aged 2¼ years, described by Dr. H. A. Dunlop and Dr. A. G. Sanders in your last issue (p. 1169) was almost exactly similar to that of the boy, aged 3 years, which I brought before the Royal Society of Medicine on Jan. 22nd, 1932 (*Proceedings*, vol. xxv, p. 715), under the heading, Severe Acute Hæmoglobinuria in a Boy. The hæmoglobinuria in the latter case was accompanied by fever and an acute hæmolytic type of anæmia with leucocytosis. Rapid recovery followed a blood transfusion of 200 c.cm. The erythrocyte count on Nov. 27th, 1931, just before the blood transfusion, was 1,320,000, and 14 days later (Dec. 11th) it was 4,500,000. I suggested that, as no toxic or other cause for the hæmoglobinuria had been discovered, the case might represent an extreme form of "acute hæmolytic anæmia," as described by Max Lederer in 1925 and 1930.

A more characteristic example of acute hæmolytic anæmia was the case of a boy, aged 11 years, that I brought before the Royal Society of Medicine on Oct. 9th, 1931 (*Proceedings*, vol. xxv., p. 15). The erythrocyte count, which on May 1st, 1931, was 780,000, reached 6,400,000 by August 19th. I headed my description: An Anæmic Breakdown or Crisis in a Child, not connected with definite Congenital Hæmolytic Jaundice. At that time I knew of only a single case in medical literature that resembled it, but soon afterwards I found that it was a typical example of the type of anæmia described by Lederer in America, Christiansen (Copenhagen, 1929), and Fiessinger and his colleagues (Paris, May, 1931). Later on I heard of the cases of Prof. L. Parsons and his colleagues at the Children's Hospital, Birmingham.

Both my patients have remained free from another attack. It is worth noting that the colour-index was at first 1·22 in my first case, and in my second (the hæmoglobinuric) one it likewise reached 1·2 at one blood count (not recorded in my printed description).

I am, Sir, yours faithfully,

London, W., June 4th. F. PARKES WEBER.

TREATMENT OF RODENT ULCER BY FREEZING

To the Editor of THE LANCET

SIR,—I should like to compliment Dr. Semon on his admirable paper dealing with the use of carbon-dioxide freezing in dermatological practice, and I would specially endorse his statement that where firm pressure can be exercised with the snow pencil "freezing will give results as good as radium" in early rodent ulcer. I have used this method consistently for many years and have a large volume of evidence in support of that opinion. I would, however, deprecate Dr. Semon's statement that "a minimum exposure for a rodent ulcer is one minute." I am quite sure this is unnecessarily long in many cases of the more superficial type, and my own practice is always to begin with exposures of half that period. I think also that sepsis is so rare as a result of freezing that it can be practically ignored. The explanation for this fact I cannot give, but the "vital reaction" (whatever that may mean) which Dr. Semon offers as an explanation is at any rate a convenient hypothesis.

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[5] Kerridge, P. M. T.: THE LANCET, 1934, i., 675.

Personally, I am reluctant to use freezing in positions overlying cartilage and I should never use it in any circumstances upon the eyelid over the eyeball. The acetone mixture I have found useful in certain cases of lupus erythematosus, where the degree of freezing desired is relatively slight, and the advantage of a liquid application which can follow outlines is obvious.

The fact that in certain types of rodent-infiltration spontaneous recovery may take place, as has been demonstrated quite definitely in certain cases—for example, of the type which I have ventured to call "erythematoid benign epithelioma"—suggests, I submit, that the malignity of rodent lesions has been considerably over-estimated, both by patients and by doctors. In the flat early patches the mischief is very superficial, and superficial treatments are usually entirely adequate. Indeed I have had cases in which these superficial types have not improved under X ray or radium treatment, but have responded most satisfactorily to freezing.

I am, Sir, yours faithfully,
E. GRAHAM-LITTLE,
Physician in charge of the Skin Department, St. Mary's Hospital.
Wimpole-street, W., June 4th.

CEREBRAL HÆMORRHAGE AND BLOOD PRESSURE

To the Editor of THE LANCET

SIR,—There is a widespread belief that arterial pressures maintained at systolic levels of 200 mm. of mercury or more, with corresponding diastolic levels of 120 mm. or more, are of grave prognostic import because it is thought that the risk of cerebral hæmorrhage is thereby greatly increased. While agreeing that cerebral hæmorrhage is possible at such high levels, my own experience during the past 20 years shows that the majority of cases occurring at ages above 40 years that I have seen in consultation have run systolic arterial pressures well below 200 mm., ranging for the most part from 190 to 145 mm. No inference can be drawn about the incidence of cerebral hæmorrhage from the presence of generalised arterio-sclerosis, for post-mortem observations have repeatedly demonstrated that the state of the superficial arteries bears no relation to the state of the cerebral arteries. At the base of the brain arterial circulation is carried on through small vessels of varying calibre. These are prone to local degeneration of the intima, and in them miliary aneurysms are frequent. In generalised arterio-sclerosis the march of events is more or less gradual, in most instances sufficient time elapsing for processes of repair to preponderate over those of degeneration. Of the total number of cases of arterio-sclerosis, less than half are associated with persistently raised arterial pressures, the sclerotic process representing a reaction to damage of the vessel walls induced by various factors, the chief of which are probably endogenous or exogenous toxins.

By the time that pressures of over 200 mm. have been reached, the walls of the larger vessels have usually become capable of withstanding grades of pressure far higher than would cause cerebral hæmorrhage in small arteries locally degenerated, and the subjects of extremely high pressures not infrequently manifest capacity for full work over a period of years. On the other hand, when arterioles surrounded by soft and yielding brain substance degenerate, they tend to burst at the weakest points under pressures which may be relatively moderate. High diastolic pressures are of importance in this connexion through production of continuous strain, systolic pressures constituting an additional fluctuating load which may become of sufficient magnitude to cause a cerebral artery weakened by disease to give way.

I am, Sir, yours faithfully,
Harley-street, May 30th. J. F. HALLS DALLY.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

School Medical Services

ON May 30th, in Committee of Supply on the Civil Estimates for 1934, Mr. RAMSBOTHAM (Parliamentary Secretary to the Board of Education) said he was well aware that there was an impression in many quarters that the physical condition of the children was deteriorating in consequence of prolonged economic distress.

NUTRITION IN DEPRESSED AREAS

The reports which he had received from up and down the country certainly did not confirm it.

According to the report of the school medical officer for the North Riding of Yorkshire, dated February, 1934—an area which had suffered a great deal from industrial distress —out of 13,000 children medically examined only seven were really bad cases, and the children pronounced subnormally nourished declined from 6·54 per 1000 in 1930 to 3·97 in 1933. The school medical officer wrote: "Malnutrition. the sequence of absolute lack of food, was not established. On the other hand, and as so often reported, the real cause appeared to be improper feeding; there was a sufficiency of food of a kind, but of the wrong type; there is also the malnourished child from the home of the well-to-do, a condition often associated with physical ill-health."

The school medical officer for Thornaby and Eston wrote: "There has been great depression throughout my area. About 50 per cent. of the men are unemployed, but an amazingly high standard of nutrition is maintained. The few that are under-fed do not suffer from lack of quantity but of quality of food, and this is not because of poverty."

CAUSES OF MALNUTRITION

He was not, Mr. Ramsbotham said, quoting that area as typical of the whole country; it clearly was not the case that the percentage of malnutrition was low in the country as a whole. He quoted it for this reason. It was apparently not generally realised that malnutrition might, and obviously did, occur in certain cases not on account of poverty but on account of unsuitable feeding or organic defects and delicacy. For example, from a recent investigation it was found to be comparatively rare for the brothers and sisters of a malnourished child to show any signs of malnourishment. As regarded the country as a whole, the figures of malnutrition showed little change from last year.

In 1931 the number per 1000 was 11·2, in 1932 it was 10·7, and in 1933 it was 11·1. There was just over 1 per cent. of the children coming within that category, and it would certainly be unreasonable to draw any inference from the fractional increase in 1933 as compared with 1932, but, nevertheless, 10 per 1000 were too many. Increasing and energetic steps were being taken to combat this evil.

PROVISION OF MEALS

The principal factor in the fight to check malnutrition as far as the Board of Education were concerned was obviously the provision of meals by local educational authorities. This year 190 out of 316 authorities had exercised the powers under the school feeding sections of the Education Act, and it was expected that ten more were shortly to adopt those powers. Those authorities covered about 70 per cent. of the school population of England and Wales, and as they were almost entirely authorities in industrial areas, somewhere between 90 and 100 per cent. of the children in industrial areas were covered by authorities which exercised those powers.

The others were mainly in rural areas or in seaside or small country towns where the experience of the Board went to show that the problem of malnutrition was of small or negligible proportions. The Board had not allowed the financial stringency of the time to impede the desires of local authorities to spend money on the provision of meals on which they paid the grant at the rate of 50 per cent. In 1928 the net expenditure of the authorities on this service was £227,000; last year it was £560,000. In 1928 the number of authorities exercising their powers in this matter was 145; last year it was 190; and this number was to be increased by about ten more. In February of this year the authorities were feeding about 292,000 children either with ordinary meals or milk, and about 212,000 of these were being fed free of charge, so that although only 1 per cent. of the public elementary schoolchildren were reported to be suffering definitely from malnutrition, free meals and milk were being provided for over 4 per cent.

In addition, there were about 900,000 children receiving one-third of a pint of milk daily for the payment of one penny under voluntary schemes organised by the National Milk Publicity Council.

SELECTIVE FEEDING

It had been represented to him that all local educational authorities should be urged to provide free dinners for the children of the poorer classes. In view of the large expense involved, that course could not be justified unless it was clearly established that the existing permissive arrangements were inadequate. He did not think that that was the case. The principle was that the expenditure on the provision of meals out of educational funds should be related to the educational capacity of the children, and should be based on a selection by school medical officers of the children, supplemented by reports from their teachers.

Such selection should include not only children definitely malnourished, but children who also showed any symptoms of subnormal nutrition. To make the provision of meals universal for all poor children would contradict that principle, and impose on local education authorities the duty of supplementing out of educational funds the assistance given from other sources for the relief of economic distress. In any event, the experience of some of the most distressed areas showed that it was possible to keep malnutrition in check by providing dinners, or even milk only, under a system of medical selection, which would include all children suffering from subnormal nutrition, but not those children who, though poor, were able to take advantage of the education offered to them.

NO EMBARGO ON NEW SERVICES

He had seen from time to time in the educational press suggestions that the Board was placing an embargo on various services for improving the physical condition of the children. No such embargo had or was being placed on the school medical service. Last year they approved 17 proposals for new clinics, and 124 forms of inspection and treatment, including the appointment of additional medical officers, dentists or specialists, school nurses, the equipment of clinics, and many other forms of expenditure, and this year they had allowed in the Estimates for an increase in the cost of the school medical service.

CRITICISM OF THE BOARD

Mr. COVE said that many black-listed schools still existed throughout the country. Teachers were supposed to teach the children cleanliness and hygiene when the physical conditions in the school were filthy in the extreme. He begged the Parliamentary Secretary not to be content with the reports sent him about the physical condition of the children, but to make investigation which would reassure the country that the children were not being ill-fed. He quoted the recent investigation in Newcastle (see THE LANCET, May 12th, p. 1029) into the physical condition of children from 2–5 years, which showed that nearly half the children in the poorer class were below the standard height compared with only 5 per cent. among the better-class children; and that 49 of the 125 poorer children had suffered from chest trouble, compared with 5 of the 124 better-class children. This investigation, he claimed, showed that there was tremendous need for better attention to the physical needs and general well-being of young children.

Dr. G. MORRISON said he understood that some education authorities were willing to lend the services of their medical officers for the junior instruction centres. He was glad to hear that the Board was not likely to be niggardly in the matter, but would look with an indulgent eye on schemes for providing medical services for those who were not insured under the National Health Insurance scheme.

Viscountess ASTOR said children between two and five years of age should be the special concern of the country. There was a gap between those ages in the medical care and treatment of young children. Splendid progress in infant welfare work had been made, but the children from two to five years of age in overcrowded areas were being neglected, although one knew the remedies. In 1931 progress was being made in the establishment of nursery schools, but it was stopped by the Economy Act. There were 5000 children in the open-air nursery schools, while 174,000 children between two and four years of age were living under slum conditions. She urged the Government to restore the cuts imposed on nursery schools, which were a vital necessity.

Mr. RAMSBOTHAM said that within the last month or two the Board had authorised two more nursery schools, and there was nothing to prevent local authorities submitting fresh proposals.

Hospitals and Prize Competitions

In the House of Lords on May 31st Lord LUKE moved to insert the following new subsection in the Betting and Lotteries Bill:—

> Notwithstanding anything contained in this section a corporate body established before the passing of this Act for a charitable purpose may conduct for any such purpose any competition in which success depends partly upon the exercise of skill (other than a competition such as is referred to in paragraph (a) of subsection (1) of this section) in respect of which such corporate body shall have submitted to the chief officer of police of the area in which their principal office is situate a copy of the rules and conditions of the competition together with the opinion of counsel that success in the competition depends to a substantial degree upon the exercise of skill and the chief officer of police shall not within fourteen days after such submission have intimated his disagreement with such opinion.

They were very anxious, he said, to preserve for the hospitals this potent source of revenue which seemed to be threatened under the provisions of the clause. The ambiguous word was "substantial" as introduced in defining the amount of skill required to keep a competition within the law, and the amendment provided for a decision as to the legality of competitions run by charitable bodies before the charity concerned had incurred the expense of launching the competition. It was very undesirable that voluntary workers endeavouring to raise funds for a charity should be open to prosecution and penalties when they were acting in accordance with the best legal advice obtainable. It was equally undesirable that the charity for which they were acting should incur the risk of losing several thousands of pounds which might have been spent in printing and advertising. Unless the amendment, or some other provision on similar lines, was embodied in the Bill, it would mean that charitable bodies must either face the above risks or forego an important source of revenue.

The British Charities Association, said Lord Luke, had run competitions for 10 years. Last year they distributed £21,000 to the hospitals, which brought their total distribution to over 900 hospitals up and down the country to about £250,000. Their competitions had usually been part skill and part chance, but not one of them had ever been challenged in the Courts. It would be impossible to run a competition entirely dependent on skill if they were going to allot prizes, because they could not define skill down to, say, one-hundredth-thousandth part, and that would be necessary when they had over 100,000 competitors. There was bound to be a considerable element of chance, but the competitor usually thought that his skill was a more important factor than it really was, and if it was the moral aspect that the Bill was dealing with, that was important. Prize competitions for charity were both popular and harmless, and charities could ill-afford at the present moment to be deprived of this source of income. The position of a hospital, or other charitable body, running a competition after the passing of the Bill, if it was unamended, would be that it would run the risk of an action to show whether the skill element was substantial or not. If the competition had started, this action might come at a critical time and cause loss to the organisation whether the skill was proved to be substantial or not. As the charity depended on the public sending in 6*d.* or 1*s.* entrance money, the mere talk of litigation would spoil the chance of success. Another point was that the views of magistrates might differ very much as to what was a "substantial" amount of skill, possibly due to their holding varying views as to the morality even of a competition.

Charitable bodies, Lord Luke concluded, could not take the risk of a gamble as to whom their case would be tried before, especially when there was no yardstick by which they could gauge the amount of skill required. The amendment sought to settle the matter before the charity started operations.

GOVERNMENT REPLY

The Marquess of LONDONDERRY said that the amendment was designed to provide machinery to enable the legality of these competitions promoted by charitable bodies to be determined in advance. One could sympathise with the desire that the British Charities Association should be allowed to promote competitions without the risk of legal proceedings, but the question whether any particular competition was or was not legal could be decided only by the Courts.

Milk and Public Health

On May 31st the House of Commons went into Committee on the money resolution in connexion with the Milk Bill.

STATEMENT BY THE MINISTER OF AGRICULTURE

Mr. ELLIOT said that the objects which the Government sought to achieve were a bigger consumption of milk and the cleaning up of the herds. The short-range policy consisted of emergency advances for putting a bottom into the market for manufactured milk, and the long-range policy was the cleaning up of the herds and, based upon that, a campaign of publicity and, if possible, of cheapness for increasing the consumption of milk and thereby dealing with the present glut. The committee of the Economic Advisory Council rightly stated in their recent report that the total eradication of bovine tuberculosis from all herds was the only complete solution of the problem of tuberculous milk. This solution could not be reached for many years, and without considerable expenditure, but, as at present advised, the Government proposed to use £750,000 primarily for making a start. He agreed with Dr. John Orr that the present position of the dairy cows was a reproach both to the Department of Health and to the Department of Agriculture. If the country had paid half the attention to the improvement of the milk-supply that it had paid to many far less urgent and important questions, this reproach would not lie at our door to-day compared with other countries. The resolution also authorised a contribution of £1,000,000 from the Exchequer on a £-for-£ basis for two years in order to increase the demand for milk. The Milk Marketing Boards would contribute the other pound. Programmes submitted by the Boards would not be approved unless they contained provision for the supply of milk to schools at reduced rates.

Mr. T. WILLIAMS said the Opposition agreed that the country ought to set to work to clean up its herds and to provide a pure milk-supply, but if millions were to be hurled away he thought they should be spent in providing the children with free milk. The Government started at the wrong end. They would not clean up the herds so long as they left the task in the hands of county councils run by farmers and landowners. A nationally organised service was required.

Mr. DE ROTHSCHILD felt grave apprehension lest the adoption of pasteurised milk should retard progress towards a pure natural milk-supply. The present conflict in medical opinion on pasteurisation might be very sincere, but it was worrying the milk-consuming public. He suggested that part of the money voted should be given to experiments in schools which would conclusively show the relative values of raw, pasteurised, and T.T. milk.

SCHOOL-CHILDREN AND SURPLUS MILK

Sir E. GREGG said he believed the supply of milk to school-children could be made to consume something like 300,000 gallons a day, or 9,000,000 gallons a month, which would account for the greater part of the Marketing Board's surplus: and if, in addition, milk was given to infants not yet of school age and to nursing mothers the whole of the surplus could be used very effectively indeed. He suggested the establishment of something in the nature of a new children's health insurance fund to which contributions should be paid by the milk industry and by the parents and made up as far as was necessary by the Government. A measure of that kind, while of the greatest value to the children, would remove discrimination between those whose parents could afford to pay and those who could not.

Sir F. ACLAND was afraid that if the proposal of distributing milk to schools was rushed some medical officer would say that a child had acquired tuberculosis through drinking milk. That would do away with all the good of the publicity campaign. He would much rather put the scheme off for a year or two until they could be certain of an adequate supply of really tubercle-free milk.

Mr. SKELTON (Under-Secretary of State for Scotland): Does the right hon. gentleman apply the same principle to the supply of milk to children in their own homes?

Sir F. ACLAND said he did not. He thought a great deal more good was done by getting more milk drunk than by saying that nobody should ever drink milk which had not been approved by all the medical authorities in the country. He thought many medical officers of health overdid their pursuit of pasteurisation and so on.

Captain HEILGERS, speaking as a producer of Grade "A" milk, said he thought doctors had done a tremendous amount to kill the production of clean milk in this country. By crabbing the milk-supply day in and day out the medical profession had made it most difficult to enable the Milk Marketing Board to raise the sales of liquid milk in this country. By plumping for pasteurisation, and imperfect pasteurisation such as existed to-day, medical men had played into the hands of the milk distributors. He agreed that a pre-pasteurisation standard was needed, but farmers could not be forced to produce cleaner milk unless they got a proper reward. It would be a great thing to clear tuberculosis from the country, but he felt that medical men had not given milk producers a fair deal as regarded the dangers which they had represented as arising from tuberculosis. The odds were 2200 to 1 in any year against any child getting tuberculosis, and the mortality-rate for measles, whooping-cough, diphtheria, and other diseases was much greater.

MILK-BORNE DISEASE

Sir F. **FREMANTLE** said no one who knew anything about this subject would wish to intensify the fears of people in regard to infection from milk; on the other hand, those who tried to belittle the amount of disease which might arise were doing the worst possible injury to the dairy industry.

> The milk commission of the People's League of Health had pointed out that at least 40 per cent. of the cows in this country are infected with tuberculosis, and that at least one in every 100 cows is actively discharging tubercle bacilli into the milk or elsewhere. According to the commission anything from 5 to 13 per cent. of the milk sold for human food contains living, virulent tubercle bacilli, while on the human side about 2000 deaths in England and Wales, mostly in children, occur annually from infections with the bovine bacillus . . . with not less than 4000 fresh cases each year.

It was absurd to say that the medical profession ought not to pay any attention to the comparatively small amount of tuberculous milk; it was no use saying that the risk ought to be taken. But there were certain devices which were perfectly possible. The problem of pasteurisation, indeed, seemed to be solving itself, since about 95 per cent. of the milk which came into London for consumption was pasteurised. At the same time, the proper use of these methods required a good deal of intelligence and ingenuity. If milk was provided for schools it would be done under the authority of either the school medical officer or of the medical officer of health, who would have to consider how it should be rendered safe. He believed that the greater number of them would say that it was possible to pasteurise milk cheaply, and that in any case the nutritive value of the milk would be infinitely to the advantage of the children, and they would desire to give them as large a supply as could be allotted. In improving present conditions the short-term policy was represented by measures such as the pasteurisation or boiling of milk. The long-term policy was that of the eradication of tubercle from the herds. It would be a mistake to suppose either that this was an impossible task, or that it could be done in a year or two. It would be very difficult, but he believed it could be achieved.

After further debate the resolution was agreed to by 177 to 43.

Price of Insulin

In the House of Commons on June 4th, on a Finance Bill amendment to place insulin on the free list, Mr. Herbert Williams appealed to the Chancellor not to remit the duty of 33⅓ per cent., because it assured home supplies if for any reason supplies from abroad should be cut off, and it afforded protection against a possible monopoly by a foreign firm. Mr. Chamberlain replied that the imposition of the duty was in fact an accident. It had followed the success of a contention not to obtain a duty upon insulin but to obtain a proper definition of dutiable fine chemicals. The manufacturers of insulin had certainly not exploited the public, but he had become aware of a feeling among diabetics that they were paying more than if there had been no duty. To them insulin was a matter of life and death, and he was unwilling to leave them with the shadow of a grievance. If injury resulted British manufacturers could still apply to the advisory committee for a new duty.

HOUSE OF COMMONS

THURSDAY, MAY 31ST

Animals Slaughtered under Tuberculosis Order

Captain **HEILGERS** asked the Minister of Agriculture the amount paid in compensation for animals slaughtered under the Tuberculosis Order of 1925 for the year 1933.—Mr. **ELLIOT** replied: The total sum paid in compensation for animals slaughtered under the Order in 1933 was £71,827.

Purity of Water in Swimming Baths

Mr. D. G. **SOMERVILLE** asked the Minister of Health whether he would consider the desirability of suggesting to all local authorities possessed of swimming baths the necessity of insisting upon a rigid standard of purity of the water.—Mr. **SHAKESPEARE** (Parliamentary Secretary to the Ministry of Health) replied: A report on the purification of water in swimming baths was prepared by the Ministry in 1929. The report emphasised the importance of clean water in public baths, and explained the best method of purification. Local authorities are well aware of the recommendations in the report, and my right hon. friend proposes again to call attention to them in the forthcoming annual report of the Ministry.

Use of Fresh Cream in Ice-cream

Lieut.-Colonel **ACLAND-TROYTE** asked the Minister of Health whether he would bring in legislation or regulations to ensure that no article must be sold as ice-cream which was not made from fresh cream.—Mr. **SHAKESPEARE** replied: My right hon. friend has no power to make regulations to the effect suggested, and he could not undertake to introduce legislation to deal solely with this matter. The general question of legislation to enable definitions of articles of food to be prescribed is receiving consideration in connexion with the recommendations of the Departmental Committee on the Composition and Description of Food which has recently reported.

Fatal Bicycle Accidents to Children

Mr. **ANSTRUTHER-GRAY** asked the Minister of Transport whether, in view of the large number of fatal bicycle accidents to children under 16, he had considered the need for an age limit under which children must not ride bicycles on the public roads.—Lieut.-Colonel **HEADLAM** (Parliamentary Secretary to the Ministry of Transport) replied: The number of bicycle accidents to young people is a matter of great regret, but I think that the adoption of a minimum age limit for cyclists would impose an unjustifiable degree of hardship on a large number of persons.

Physical Condition of Naval Recruits

Sir **ROBERT GOWER** asked the First Lord of the Admiralty how many boys and men respectively were accepted in the year 1933 for His Majesty's Navy and Royal Marines respectively; how many were rejected on account of some physical deficiency; and what was the corresponding percentages of rejections to acceptances in the years 1929, 1930, 1931, and 1932 respectively.—Sir **BOLTON EYRES-MONSELL** replied: The following is a statement showing the number of boys and men entered in the Royal Navy and Royal Marines during the year April 1st, 1933, to March 31st, 1934:—

	R.N.	R.M.
Boys	2607	132
Men	3219	402

Of 11,645 medically examined, 4524 were rejected on account of some physical deficiency. The corresponding percentages of rejections to acceptances during the years in question were:—

1929–30	40·65	1931–32	43·33
1930–31	40·33	1932–33	41·00

MONDAY, JUNE 4TH

Vaccination of Naval Ratings

Mr. **GROVES** asked the First Lord of the Admiralty whether, in view of the terms of No. 12 of the King's Regulations, Article 1417, relative to vaccination, it was the practice to allow persons to enter the service who were conscientious objectors to vaccination.—Sir B. **EYRES-MONSELL** replied: No, Sir. All candidates on entry are required to declare their willingness to be vaccinated or revaccinated and inoculated, if necessary, otherwise they are not accepted for entry.

Fat Content of Tinned Cream

Mr. **TEMPLE MORRIS** asked the Minister of Health whether he was aware that tinned cream, labelled thick cream but containing only about 20 per cent. of cream, was being sold in different parts of the country; and whether this practice was approved by his department.—Sir **HILTON YOUNG** replied: I am aware that tinned cream containing about 20 per cent. of milk fat is sometimes labelled as thick cream. The question whether this is a false description is one for the consideration of the Courts in the event of proceedings being taken under the Food and Drugs (Adulteration) Act. The matter is not one in which I am empowered to take action.

TUESDAY, JUNE 5TH

Ventilation of the House of Commons

Mr. BERNAYS asked the First Commissioner of Works whether he was satisfied that every possible effort had been made to improve the ventilation of the House of Commons.—Mr. ORMSBY-GORE replied: A very comprehensive engineering report on this subject was presented to Parliament in June, 1931, as Command Paper No. 3871 of that year. This report is available in the sale office. I have recently had analyses made of the air in the chamber and lobbies at different times of the day, and I am sending the hon. Member a copy of the Government Chemist's report. I am further carrying out a similar but more complete survey of the ventilation of the whole building, as a result of which I hope it may be possible for more definite conclusions to be reached.

Mr. BERNAYS asked if it was not the fact that the atmosphere of the House compared very badly with that of any cinemas in the country?

Mr. ORMSBY-GORE said that that was certainly his own impression, but all the scientific and technical experts who had investigated the matter found to the contrary.

Elimination of Noise from Aeroplanes

Mr. BERNAYS asked the Under-Secretary of State for Air whether he would consider the introduction of legislation making the use of silencers obligatory on privately owned aeroplanes.—Sir P. SASSOON replied: No, Sir. My noble friend is wholly in sympathy with the object in view—namely, the elimination of all avoidable noise in flying; but it would be altogether premature at present, and indeed useless, to make the fitting of silencers legally obligatory. Silencers would diminish the noise from the engine, but would not affect that from the propeller, and they would have the disadvantages at once of impairing the efficiency of the aircraft and of increasing the risk of fire. The whole question is under active consideration and it is hoped that the technical progress which has been and is continuing to be made will have the effect eventually of solving this very difficult problem.

MEDICAL NEWS

University of Oxford

The degree of doctor of medicine has been conferred on K. N. Irvine.

University of London

Prof. G. E. Gask and Mr. H. L. Eason have been appointed governors of the British Post-Graduate Medical School.

Applications for the William Julius Mickle Fellowship should reach the principal of the university not later than Oct. 1st. This fellowship is awarded annually to the man or woman who has done most to advance medical art or science in the preceding five years. Candidates must be graduates of the university and resident in London. Essays for the Paul Philip Reitlinger prize should reach the University not later than Oct. 1st. They should embody the result of some research work on a medical subject carried out by the candidate. Further particulars of both these awards may be had from the academic registrar.

University of Wales

At recent examinations the following candidates were successful:—

TUBERCULOUS DISEASES DIPLOMA

P. K. Ghosh, M.B. Calcutta; B. K. Pal, M.B. Calcutta; H. K. B. Rustogi, M.B. Lucknow; P. K. Sen, M.D. Berlin; and H. A. Zaki, M.B. Cairo.

Society of Apothecaries of London

Dr. Marjorie Houghton James has satisfied the examiners for the Mastery of Midwifery.

King Edward VII. Hospital, Windsor

At the annual meeting of this hospital last week it was stated that the strain of road accidents had compelled the provision of further accommodation. There is pressing need for an eye ward, owing to the great increase in the number of ophthalmic cases urgently requiring treatment. There is a deficiency of about £15,000, and there is still need that £2500 should be found for the new buildings. The result of 25,000 letters of appeal was £2324.

Fellowship of Medicine and Post-Graduate Medical Association

The next lecture-demonstrations in the series being given by Dr. A. E. Clark-Kennedy at the Medical Society of London, 11, Chandos-street, Cavendish-square, W., will be on œdema and diuretics (Tuesday, June 12th), and renal insufficiency (June 19th). Forthcoming courses include proctology, at St. Mark's Hospital, from June 11th to 16th; medicine, surgery, and the specialties, at the Prince of Wales's Hospital, from June 11th to 23rd and again from June 25th to July 7th; cardiology, at the National Heart Hospital, June 25th to July 7th; diseases of children, at the Children's Clinic, June 25th to July 7th; ophthalmology, at the Central London Ophthalmic Hospital, July 2nd to 7th; and a week-end course in medicine and surgery, at the Metropolitan Hospital, June 30th and July 1st.

St. Thomas's Hospital Medical School

The prizes of the school will be distributed on Tuesday, June 26th, by the Earl of Derby, in the Governor's Hall of the hospital.

Tour in the South of France

The medical faculty of Bordeaux and the medical, thermal, and climatic federation of the Pyrenees have arranged their third tour in this region for men of medicine and science. The party will leave Périguex on August 26th, and the itinerary will include Bordeaux, Dax, Biarritz, and Bayonne. Pau will be reached on Sept. 3rd. A short tour (Sept. 3rd–6th) in the Pyrenees has been arranged and Pau will be the starting-point. Further particulars may be had from Dr. M. Faure, at La Malou (Hérault).

London Hospital Medical College

It is announced that the Queen has consented to open the new students' hostel of this college on Tuesday, July 3rd, at 3.30 P.M. The sum of £15,000 has been collected towards the building, but another £17,000 is required if the hostel is to start free from debt. It stands on hospital ground and the architect is Mr. Edward Maufe. A short article on the project has already appeared in THE LANCET (1932, ii., 1080).

The late Dr. Bernard Hollander

A meeting will be held in the Essex Hall, Strand, London, on Tuesday next, June 12th, at 7 P.M., when addresses will be delivered in memory of the late Dr. Bernard Hollander. The meeting is organised by the British Phrenological Society, and those attending it will be addressed by Dr. Hubert J. Norman, Mr. J. P. Gilmour, and Mrs. C. Stackpool O'Dell, dealing respectively with Dr. Hollander's work as physician, rationalist, and phrenologist. The chair will be taken by Mr. C. E. Sewell, and admission to the meeting is free, a collection being taken up to defray expenses only.

Royal Society of Medicine

Section of Radiology.—The annual dinner of this section was held on June 1st, Dr. R. S. Paterson, the president, being in the chair. He proposed the health of the guests, coupled with the name of Mr. W. H. Collins. Mr. Collins hoped that nobody would be jealous of the Middlesex Hospital, but always realise that its department of radiology—which they hoped would be the finest in the country—was open to everybody. That hospital was very fortunate in having Dr. Graham Hodgson to run the department. Dr. Robert Hutchison proposed the Section of Radiology. He said he always liked to send his cases to a sympathetic radiologist—one who would let the physician down gently. The section was in a vigorous condition, and represented one of the great advancing lines in medicine. Dr. F. Hernaman-Johnson said that it now had nearly 300 members. He suggested the provision of a presidential robe for each section, Surgery having a gown decorated with knives and coffins, and Radiology showing healing angels.

A Discussion on Malnutrition

As already announced, Sir Gowland Hopkins will take the chair at a meeting arranged by the Committee Against Malnutrition, which will be held at 8 P.M. on Wednesday next at 34, Red Lion-square, London, W.C. The speakers will include Dr. Stella Churchill, Prof. J. B. S. Haldane, Dr. R. D. Lawrence, and Dr. R. A. Lyster. Tickets may be had from the hon. secretary of the committee at 19c, Eagle-street, W.C.1.

Payment of Medical Staffs in South Africa

The Orange Free State Provincial Administration is considering the advisability of paying a small salary, or retaining fee, to all doctors at present giving honorary service in the provincial hospitals. During the past year or two the number of free patients in the hospitals has grown steadily, with the result that the honorary physicians have found it very difficult to cope with the cases. The suggestion is made that if the honorary medical staff was remunerated to some extent the hospital managements would have more control and an opportunity of introducing effective organisation regarding poor patients.

Scottish Medical Golfing Society

This society has just been formed for the benefit of Scottish members of the medical profession in the London area. The president is Dr. Bertram Shires; the vice-presidents, Sir Ashley Mackintosh, Sir Robert Muir, Prof. James Musgrove, Sir Harold Stiles; the hon. treasurer, Dr. Bruce Williamson; and the hon. secretaries, Mr. Norman Fleming and Dr. Burton Yule. Doctors desiring to apply for membership for the above society are requested to communicate with the senior honorary secretary at 92, Harley-street, London, W.1, mentioning club and handicap.

Medical Reunion in Vienna

A committee of Viennese physicians are making arrangements to hold an informal reunion from July 9th to 15th in Vienna, primarily of medical men who have received the whole or part of their training in that city. Members of the profession who have trained elsewhere will, however, also be welcome. Scientific meetings and discussions will be held and visits will be paid to hospitals; there will also be social meetings and excursions. Special travel and accommodation rates will be offered to doctors and their families attending the reunion. Further particulars may be had from the Austrian Federal Railways, 31, Lower Regent-street, London, W.1.

Society for the Provision of Birth Control Clinics

On Tuesday next, June 12th, a lecture will be delivered on the theory and practice of contraception at this centre, 153a, East-street, London, S.E.17, by Dr. Gladys Cox. Practitioners and medical students who have completed their gynæcological course are invited to the lecture. Practical demonstrations in technique will also be open to the same audience on Tuesday, June 19th, at 6 P.M. and at 7 P.M., and on Tuesday, June 26th, at the same hours. Those wishing to attend these demonstrations should bring rubber gloves with them, and a fee of 2*s.* 6*d.* is charged for admission. Tickets should be applied for in advance at the Walworth Centre of the Society for the Provision of Birth Control Clinics.

Welfare of the Deaf

Sir Hilton Young, the Minister of Health, received a deputation on May 30th from the National Institute for the Deaf, the Counties Associations for the Deaf, the National College of Teachers of the Deaf, the Council of Church Missioners to the Deaf, and the British Deaf and Dumb Association. The object of the deputation, which was introduced by Lord Charnwood, was to suggest the necessity for legislation to make the welfare of the deaf the duty of local authorities, and to ask for the appointment of an advisory committee on the deaf. The Minister said that he was in full sympathy with the desire of the deputation to promote the welfare of the deaf to the fullest possible extent. He believed, however, that progress was to be sought *not* in the imposition of compulsory duties on local authorities but in the encouragement of the work of these authorities and of voluntary agencies on the lines proposed in Circular 1337 issued by his department.

Infants Hospital, Vincent-square

Last week Prince George presided at a dinner at Guildhall in aid of the funds of this hospital. The special appeal produced £10,000. The hospital, it was stated, contains 100 cots, and there are a further 18 at the convalescent home at Burnham; the out-patients' department can deal with 2000 cases a month.

Cowdray Club and College of Nursing

H.M. the Queen visited the Cowdray Club on June 2nd, and inspected the "room of memory," the club's memorial to Annie Viscountess Cowdray, and two new floors of bedrooms. This is part of the provision, rendered possible by the gift of Lady Cowdray in 1932, which included refronting the whole building and substantially enlarging the College.

A Memorial at Leeds

On June 1st, at the General Infirmary at Leeds, Lord Moynihan unveiled a portrait of his father-in-law, Mr. T. R. Jessop, who for 20 years served on the active staff of the infirmary. Mr. Jessop, who died in 1903, described himself as the last of the "general consultants," and to the end of his career saw many medical cases in consultation, though it was as a surgeon that he did his outstanding work. He was the first in England to operate *successfully for sarcoma of the kidney, and recounted his* experience of operations for renal and vesical calculus in the Bradshaw lecture of 1901.

Medical Diary

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES

PADDINGTON MEDICAL SOCIETY.

TUESDAY, June 12th.—9 P.M. (at the Great Western Hotel, Paddington), Dr. W. G. Bendle: The Doctor and His Critics (Presidential Address).

NATIONAL ASSOCIATION FOR THE PREVENTION OF TUBERCULOSIS.

THURSDAY, June 14th, and FRIDAY (at the County Hall, Westminster Bridge), Conference on the National Tuberculosis Scheme: the Experience of 21 Years.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.

TUESDAY, June 12th.—5 P.M., Prof. O. L. V. S. de Wesselow On Arterial Hypertension (last Croonian Lecture).

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY, June 11th, to SATURDAY, June 16th.—LONDON LOCK HOSPITAL, 91, Dean-street, W. Afternoon Course in Venereal Disease.—ST. MARK'S HOSPITAL, City-road, E.C. All-day Course in Proctology.—PRINCE OF WALES'S HOSPITAL, Tottenham, N.15. All-day Course in Medicine, Surgery, and the Specialties.—MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W. Lecture-demonstration on Œdema and Diuretics by Dr. A. E. Clark-Kennedy, at 2.30 P.M., on Tues
Individual clinics in various
and surgery are available daily.
clinics, &c., arranged by the
are open only to Members and Associates.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION, St. James's Hospital, Ouseley-road, Balham.

WEDNESDAY, June 13th.—4 P.M., Dr. C. E. Lakin: Demonstration of Medical Cases.

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE, Hammersmith, W.

Daily, 2 P.M., Medical and Surgical Clinics, Operations.

MONDAY, June 11th.—10 A.M., Medical Wards. Pathological Demonstration. 11 A.M., Surgical Wards. 2 P.M., Gynæcological and Surgical Wards, Eye and Gynæcological Clinics.

TUESDAY.—10 A.M., Medical Wards. 11 A.M., Surgical Wards. 2 P.M., Throat, Nose, and Ear Clinic. 4.15 P.M., Lecture, Mr. Green-Armytage: The Menopause.

WEDNESDAY.—10 A.M., Medical and Children's Wards, Children's Clinic. 2 P.M., Eye Clinic.

THURSDAY.—10 A.M., Neurological and Gynæcological Clinics. 11.30 A.M., Fracture Demonstration. 2 P.M., Eye and Genito-urinary Clinics.

FRIDAY.—10 A.M., Skin Clinic. 12 noon, Lecture on Treatment. 2 P.M., Throat Clinic.

SATURDAY.—10 A.M., Medical and Surgical Wards, Children's and Surgical Clinics. The lectures at 4.15 P.M. are open to all medical practitioners without fee.

CHADWICK PUBLIC LECTURES.

THURSDAY, June 14th.—5.30 P.M. (in the Chelsea Physic Garden, Swan Walk, Chelsea). Mr. E. Augustus Bowles: Simples and Herbals. Illustrated by Living Plants.

UNIVERSITY OF BIRMINGHAM.

TUESDAY, June 12th.—3.30 to 5 P.M. (at the General Hospital), Mr. B. T. Rose: Demonstration of O.P. Surgical Cases.

FRIDAY.—3.30 to 5 P.M. (at the Queen's Hospital), Dr. O. Brenner: Rheumatic Heart Disease.

LEEDS GENERAL INFIRMARY.

TUESDAY, June 12th.—3.30 P.M., Mr. La Touche: Radio-surgical Demonstration.

Appointments

HART, P. D'ARCY, M.D., M.R.C.P. Lond., has been appointed Assistant Physician to University College Hospital.

Certifying Surgeons under the Factory and Workshop Acts: MALCOLM, F. J., M.B., Ch.B. Aberd. (Kemnay, Aberdeenshire); SHEPHARD, W. H., L.R.C.P. Lond., M.R.C.S. (Tewkesbury, Gloucestershire).

Vacancies

For further information refer to the advertisement columns

Archway Hospital, Highgate, N.—Temporary Asst. M.O. At rate of £250.
Ashton-under-Lyne District Infirmary.—H.S. At rate of £150.
Bagdad. Royal College of Medicine.—Chair of Materia Medica. Salary at rate of I.D. 960 to I.D. 1200 per annum.
Bath, Royal United Hospital.—Out-Patient and Cas. O. H.S. Each at rate of £150. Also Hon. Med. Reg.
Birmingham City Education Committee.—Asst. School M.O. £500.
Blackburn Royal Infirmary.—Res. Cas. O. £150.
Bristol Eye Hospital.—Asst. Res. H.S. At rate of £100.
Bristol General Hospital.—Sen. Res. M.O. £200. Cas. H.S. At rate of £100. Also Two H.P.'s., Two H.S.'s., Res. Obstet. O., and H.S. to Spec. Depts. Each at rate of £80.
Bristol Royal Infirmary.—Hon. Physician, Hon. Asst. Phy., Hon. Reg. to Orthopædic Dept. Also Hon. Anæsthetist.
Cancer Hospital, Fulham-road, S.W.—Second Asst. Pathologist. £250.
Cardiff, University College of South Wales and Monmouthshire.—Asst. Lecturer in Anatomy. £400. Asst. Lecturer in Physiology. £400. Asst. Lecturer in Histology. £300.
Connaught Hospital, Walthamstow, E.—H.S. At rate of £100.
Delhi, Countess of Dufferin's Fund.—Three Vacancies for Women's Medical Service for India.
Durham C.C.—District Tuber. M.O. £500.
Edinburgh Royal College of Physicians.—Kirk Duncannon Fellowship for Medical Research. £150–£200.
Evelina Hospital for Sick Children, Southwark, S.E.—H.P. At rate of £120.
Exeter, Royal Devon and Exeter Hospital.—H.S. to Ear, Nose, and Throat Dept. At rate of £150.
Fareham, Hants, Knowle Mental Hospital.—Third Asst. M.O. £350.
Glasgow, Lightburn Joint Hospital, Shettleston.—Res. Physician. £350.
Great Yarmouth General Hospital.—H.S. £140.
Guy's Hospital, London, S.E.—Ophthalmic Surgeon.
Hampstead General and N.W. London Hospital, Haverstock Hill, N.W.—H.S. At rate of £100.
Hospital for Sick Children, Great Ormond-street, W.C.—Physician to Skin Department.
Hospital for Tropical Diseases, Gordon-street, W.C.—H.P. At rate of £120.
Hull Royal Infirmary.—Cas. O. At rate of £150.
Ilford, King George Hospital.—Cas. O. At rate of £130.
Indian Medical Service.—Commissions.
Infants Hospital, Vincent-square, Westminster.—Clin. Asst. to Out-patient Dept.
King's College Hospital.—Radium Registrar.
King's Lynn, West Norfolk and King's Lynn General Hospital.—H.P. At rate of £125.
Leeds General Infirmary.—Hon. Asst. Surgeon.
L.C.C.—Radiologist. £1500.
London Jewish Hospital, Stepney Green, E.—Hon. Surgeon.
London University.—Examinerships.
Maidstone, West Kent General Hospital.—H.P. £150.
Manchester Hospital for Consumption and Diseases of the Throat and Chest.—Res. Surg. O. for St. Ann's Home. £200.
Manchester Royal Children's Hospital.—Asst. Surgeon. £50.
Manchester Royal Eye Hospital.—Jun. H.S. £120.
Mansfield, Notts, Harlow Wood Orthopædic Hospital.—Two H.S.'s. Each at rate of £175.
Middlesbrough, North Riding Infirmary.—H.P. At rate of £125.
Mile End Hospital, Bancroft-road, E.—Asst. M.O. £350.
Ministry of Health.—Two Medical Officers. Each £833.
Newcastle-upon-Tyne Hospital for Sick Children.—Res. Surg. O. £250.
Northampton General Hospital.—H.S. to Ear, Nose and Throat Dept. At rate of £150.
Oldham Royal Infirmary.—H.S. At rate of £175.
Plymouth, South Devon and East Cornwall Hospital.—H.P. and H.S. Each at rate of £120.
Portsmouth Royal Hospital.—H.P. and H.S. Each at rate of £130.
Preston County Mental Hospital, Whittingham.—Jun. Asst. M.O. £500.
Preston and County of Lancashire Royal Infirmary.—H.P. Also Special House Surgeon. Salary in each case £150.
Princess Elizabeth of York Hospital for Children, Shadwell, E.—H.P., and H.S. Each at rate of £125.
Queen Mary's Hospital for the East End, E.—Cas. O. Also Res. Anæsthetist and H.P. At the rate of £150 and £120 respectively.
Queen's Hospital for Children, Hackney, E.—H.P. and Cas. O. Each at rate of £100. Also Surgeon for Ear, Nose, and Throat Dept.
Reading, Royal Berkshire Hospital.—H.S. £150.
Royal Dental Hospital of London, Leicester-square, W.C.—Hon. Pathologist.
Royal Masonic Hospital, Ravenscourt Park, W.—Res. M.O. £300. Also Res. Surg. O. At rate of £250.
Ryde, Royal Isle of Wight County Hospital.—Res. H.S. £180.
St. Leonard's Hospital, Hoxton-street, Shoreditch, N.—Asst. M.O. £350.
St. Peter's Hospital for Stone, Henrietta-street, W.C.—Hon. Clin. Assts. to Out-Patient Dept.
[illegible]—Med. Reg. £250. Also H.P. and H.S.
[illegible]*tal.*—H.S. Also H.P. Each at rate of £100.
Smethwick County Borough.—Asst. M.O.H. and Asst. School M.O. £500.
Southampton, Royal South Hants and Southampton Hospital.—H.P., Cas. O., Res. Anæsthetist, and H.S. for Ear, Nose, and Throat Dept. Also H.S. Each at rate of £150.
Southend-on-Sea General Hospital.—H.S. At rate of £100.
Stockport Infirmary.—H.S. £150.
Stoke-on-Trent, North Staffordshire Royal Infirmary.—H.S. At rate of £150. Also Hon. Radiologist.
Weir Hospital, Grove-road, Balham, S.W.—Jun. Res. M.O. £150.
West Bromwich, Hallam Hospital.—Res. H.P. At rate of £200.
West London Hospital, Hammersmith-road, W.—H.P., H.S. and Res. Anæsthetist. Each at rate of £100.
Willesden General Hospital, N.W.—Cas. O. and H.S. Each at rate of £100. Also Clin. Assts. to Out-patients' Dept.
Wolverhampton and Midland Counties Eye Infirmary.—H.S. £150.
Wolverhampton Royal Hospital.—H.S. for Orthopædic and Fracture Dept. At rate of £100.
Worksop, Victoria Hospital.—H.S. £170.

The Chief Inspector of Factories announces the following vacant appointments for Certifying Factory Surgeons at Bolton North, Lancs; Halesworth, Suffolk; Sheffield West, Yorks; New Cumnock, Ayrshire; and Stratford-on-Avon, Warwick.

Births, Marriages, and Deaths

BIRTHS

BASHALL.—On May 31st, the wife of Dr. C. J. Bashall, of Burbage, Wilts, of a son.

BLACKWOOD.—On May 29th, at Penlea, Newcastle-on-Tyne, the wife of Frederick A. Blackwood, F.R.C.S. Edin., of a son.

MARRIAGES

BROGDEN—GUYER.—On May 28th, at Seascale, Cumberland. George A. Brodgen, M.D., to Grace Elizabeth, widow of John Fisher Guyer.

REES—SHINNER.—On June 2nd, at St. James's Church, Piccadilly, Edward J. Rees, M.R.C.S., L.R.C.P., to Sylvia Mercy, the only daughter of Mr. and Mrs. Ernest George Shinner, of Hill Barn, Purley Downs, Surrey.

STEWARD—READING.—On June 2nd, at Holy Trinity Church, Marylebone, Graham Villiers Steward, L.R.C.P., M.R.C.S., to Margaret Edith, second daughter of Mr. and Mrs. P. G. Reading, of Arran-road, Catford, S.E.

DEATHS

DIXON.—On June 3rd, at Randolph-gardens, N.W., Captain Alban Dixon, late R.A.M.C., aged 52.

FINUCANE.—On May 31st, at Hurst House, Sedlescombe, Sussex, Morgan Ignatius Finucane, M.R.C.S., L.R.C.P., J.P., Barrister-at-Law, in his 69th year.

KENDRICK.—On May 30th, at St. Medards, Norton-street, Coventry, Captain Horace Herbert Kendrick, M.R.C.S., L.R.C.P., aged 64.

ROBSON.—On June 3rd, at Homefield-road, Chiswick, W., William Waller Constable Robson, M.R.C.S., L.R.C.P. Lond., aged 74.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

NOTES, COMMENTS, AND ABSTRACTS

JUGGLING WITH FIGURES

IN the *Annales d'hygiène* for March Mr. Auguste Lumière, the biologist, returns to the thesis which, in France at any rate, is becoming more and more associated with his name. While not denying the bacillary origin of tuberculosis, he is convinced that the susceptibility to infection depends chiefly on hereditary qualities. The distribution of tuberculosis in a given area does not, he maintains, depend on infection of one person by another, but on factors which make themselves felt in the distribution of other conditions such as cancer, births, and marriages. Statistics obtained in the town of Lyons seem to him to support his point of view. In the 20-year period 1906–1925, Dr. P. Vigne, this town's medical officer of health, found that as many as 18,121 of the 23,218 houses in Lyons were innocent of any tuberculosis death in the period under review. There were 3963 houses in each of which there had been one tuberculosis death, and 886, in each of which there had been two tuberculosis deaths. The houses with three tuberculosis deaths in each numbered 212, and those with four tuberculosis deaths in each numbered 58. At the bottom of this list there were two houses with seven tuberculosis deaths each, and one house with eight such deaths. Lumière then shows that the distribution of births by houses is remarkably similar. These births, he states, are due only to the play of chance and prove, therefore, that the tuberculosis deaths also are distributed by the same law and are unaffected by hygienic or other conditions. Why it should be assumed that births are distributed by chance it is difficult to see. The birth-rate, it is well known, varies considerably by social status, and therefore the probability of a birth being registered in a house must differ widely from one house to another. In other words this control group cannot possibly be an effective one. Further, the average number of deaths from tuberculosis per house in these data is 0·29 (i.e., 6703 deaths in 23,218 houses); if this figure be used to represent the probability of a case being recorded in a house it can, in fact, be shown by statistical means that the distribution of the cases over the houses is nothing like what would arise by chance. There is in the observations a gross excess of houses containing multiple cases. To presume that the probability is equal for all houses must, of course, be erroneous, for houses must differ in the number, age, sex, and occupation of the inhabitants. But the data provided do not allow a better test to be applied. In his appeal to the laws of chance Lumière appears no more helpful than those whom he condemns for having neglected them. It would, in fact, be interesting to see the distribution by houses of an equal number of cases of a disease that Lumière would accept as infectious—small-pox, for instance. If this should prove similar it would in simple fashion show the fallacy of his method.

BLOOD-SUGAR AND GLYCOSURIA IN GRAVES'S DISEASE

IN a supplement (1934, No. LIV.) to *Acta Medica Scandinavica*, W. T. Andersen reports urine- and blood-sugar studies in 31 patients with exophthalmic goitre. The diagnosis was based on tachycardia, goitre, and tremor, and exophthalmos was not considered a necessary symptom. In all the patients sugar was discovered in the urine in some specimen passed during the day, though it might not amount to more than a trace. Using a similar technique glycosuria was present in only 20 per cent. of normal controls. The fasting blood-sugar level was usually found normal in the goitre patients, but the blood-sugar curve after glucose by mouth was increased in height and in duration, more especially in the severe cases. The investigation suggested that the threshold for glycosuria was a little below normal. After thyroidectomy the abnormalities in blood- and urine-sugar tend to disappear; thus glycosuria has been found to be no longer present, the renal threshold is a little higher, and sugar-tolerance tests show a fall in what were previously the highest curves. The changes in carbohydrate metabolism are held to be explained best by Falta's theory which supposes that the thyroid secretion interferes with glycogen storage in the liver. This leads to increased demands on pancreatic activity, and in a high proportion of cases the response is apparently inadequate to maintain completely normal conditions.

LINES FROM A G.P.

WE published recently (THE LANCET, May 19th, p. 1100) some pleasant "Lines *to* a G.P." extracted from the *St. Mary's Hospital Gazette*. Now Dr. F. L. Nicholls, writing from Fulbourn, has sent us some "Lines *from* a G.P." in which the writer sets out the trials of the general practitioner of olden time—the exact date of their writing is unknown. The first ten lines run as follows:—

> "Luckless he, whom hard fates urge on
> To practice as a country surgeon
> To drag a heavy galling chain
> The slave of all for party gain:
> To ride regardless of all weather
> Thru' frost and snow and hail together
> Sometimes to walk when dark as pitch
> And get a tumble in a ditch
> To smile and bow when sick and tired,
> Considered as a servant hired."

In similar vein the author points out the troubles of general practitioners with neurotic patients and those of surly temper or neurotic temper, and dwells on the grave dilemma where two urgent cases, probably obstetric, summon the practitioner simultaneously to different points of the compass. The irritation caused by constant disturbance at meals and by the petty scale of payment are also made the subject of mournful rhyming. Dr. Nicholls says that the lines will arouse memories in those who look back on country practice 50 or 60 years ago, and for that reason sends them for publication. But their principal interest lies in their suggested attribution, for Dr. Nicholls copied the lines from a scrapbook bearing the date 1876 and the name "Dr. E. Jenner" was appended to them. The introducer of vaccination was born in 1749 and died in 1823, but for some years before he died he practised in London. If in the verses from which we quote the opening sentences he was recording personal experiences they would probably have been written about 140 years ago, unless they are reminiscent. There is nothing by which to date their composition, but it is, surely, improbable that Edward Jenner, an accomplished and erudite man, could have been the author.

MALARIA ACQUIRED IN SYDNEY

MALARIA was made a notifiable disease in New South Wales from March, 1915, to November, 1919. During this period 229 cases were notified, but in only two of them was the infection acquired in the State. Since then a further four indigenous cases have been reported, one of the patients having contracted malaria in Sydney itself. The report of the director-general of public health for New South Wales for the years 1931 and 1932, which has just been issued, contains an account, by Dr. E. L. Morgan, of yet another case of the disease acquired in Sydney. The patient, a girl aged 9 years, was born in Sydney and had never been out of the city. No member of the family of ten was suffering from malaria or had ever been in malarial districts. She was admitted to the Royal Alexandra Hospital for Children in January, 1931, suffering from abdominal pain and frequent rigors, and blood examination showed the presence of numerous benign tertian parasites (*Plasmodium vivax*). Anopheline mosquitoes are known to exist in the vicinity, and it is thought that the infection was carried from some southern Europeans or Asiatics, of whom a small number live in the suburb from which the child comes.

ADDRESSES AND ORIGINAL ARTICLES

OBSERVATIONS ON SOME INJURIES OF THE KNEE-JOINT*

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The majority of injuries of the knee as of other joints make a natural and complete recovery without special treatment. Severe strain of the knee is, however, common, because this joint has to sustain body-weight transmitted to it through long levers, and whilst doing so allows a wide range of movement.

The knee-joint consists essentially of the broadened ends of the tibia and femur with a sesamoid bone—the patella—in the extensor apparatus, and two fibrocartilaginous discs interposed between the femur and tibia. Nature has provided it with powerful muscles for its control and strong ligaments on which it largely depends for its stability. Although the muscles form the first line of defence against injury, there seems reason to suppose that severe lesions of the knee may be classified into two main groups: those due to direct injury when the muscles are not on guard or their contractile power has been overcome, and those associated with the effort of the muscles to avert injury. The former includes rupture of ligaments, dislocations, and stellate fracture of the patella—the latter, other lesions of the extensor apparatus, and I think also most lesions of the intra-articular fibrocartilages.

In a previous publication,[1] in reviewing a series of 522 consecutive cases of recurrent or chronic disturbance of the normal mechanism of the knee-joint as a result of injury, I found that 250, or almost one half, were diagnosed as due to a lesion of one or other of the intra-articular fibrocartilages. In 179 the internal and in 71 the external cartilage appeared to be the site of the lesion. Exploration of the joint was carried out in 185 of these cases, and a careful study of the findings at the time of operation revealed two facts which were at variance with the published findings of other observers. These were: (1) the relative frequency of lesions of the external cartilage; (2) the high proportion of the lesions found to be present in the posterior segment of the cartilage.

Relative Frequency of the Site of Lesions

As regards the relative frequency of lesions of the cartilages it has always been agreed that the internal cartilage is more liable to injury than the external. Jones,[2] Martin,[3] Campbell,[4] Henderson,[5] Fisher,[6] MacAusland,[7] Surls and Osgood,[8] and others, in their published writings, find that lesions of the internal are from 15 to 4 times more common than those of the external cartilage. My own statistics showed that the internal cartilage was removed in 139, and the external cartilage in 46 cases. Of these 185 cases, however, a definite lesion of the cartilage was found in only 157: 118 internal, 39 external. The remainder were classified in the notes as "N.D.L."—i.e., no demonstrable lesion. These figures show that, in the cases in which a definite lesion was demonstrated at the time of operating, the relative frequency of injury of the internal cartilage to that of the external was 3 to 1. As this aroused criticism at the time, I have reviewed a further series of 110 consecutive cases operated on for a suspected cartilage injury. A definite lesion was found to be present in 98 of these, the internal semilunar cartilage being involved in 66 and the external in 32. This gives an approximate ratio of 2 to 1. If we combine the two groups of statistics we find:

Total number of cases operated on ..	295
Definite lesions found in 255	86·44%

Of 255 cases with definite lesions:

Internal cartilage was affected in	184 (72·10%).
External ,, ,, ,,	71 (27·84%).

This gives a ratio of 2·6 to 1. What is the explanation of this variance from the findings of other observers? I would suggest that it is more apparent than real, and that where it is real it is due to the difficulty of accurate diagnosis in many lesions of the knee-joint. I am in almost entire agreement with Martin when he writes:

> "I would here wish to emphasise that where a proper diagnosis has been made, the injury is always in the nature of a tear or split, and when such is not found the probability is that a wrong diagnosis has been made, some other structure having been injured."

Surgical text-books usually confine themselves to a description of commonly recognised lesions in relation to particular joints. The patient complains of pain and/or limitation of movement in conditions such as tennis elbow, tenosynovitis, the presence of a palpable ganglion, &c. These conditions are readily diagnosed when they occur in situations where the structures involved are accessible to direct palpation. This, however, is not possible in the case of many of the ligaments, bursæ, &c., apt to be affected by strain of the knee-joint. It is to be noted that in my statistics I have confined myself to lesions which could be demonstrated at the time of operation. Martin failed to demonstrate a lesion in 4·5 per cent. of the cases operated on, and Sir Robert Jones considered definite lesions present in but 117 of 190 cases. In this series I failed to establish a diagnosis in 13·56 per cent. of the cases on which I operated. I have not included cases of hypermobility of the cartilage, as although some undue mobility of the cartilage may have been present, I have felt that this might be a variable factor, so that my experience did not justify me in classifying them as definite lesions.

The second point which interested me was that the very large percentage of the lesions were confined to the posterior half of the cartilage, and that involvement of the anterior half was, when present, usually secondary to this.

Internal cartilage cases.—Total operated upon, 214. Lesions found.

(a) Fracture or detachment in anterior half	35 (16·35%).
(b) ,, ,, ,, posterior ,,	89 (41·59%).
(c) Bucket handle type	60 (28·04%).
(d) No demonstrable lesion	30 (14·02%).

External cartilage cases.—Total operated upon, 81. Lesions found.

(a) Fracture or detachment in anterior half	19 (23·46%).
(b) ,, ,, ,, posterior ,,	40 (49·38%).
(c) Bucket handle type	8 (10·00%).
(d) No demonstrable lesion	10 (12·35%).

Of the 255 definite lesions demonstrated there were:

54	fractures or detachments of anterior half	=21·18%.
129	,, ,, ,, posterior ,,	=50·59%.
68	Bucket handle type	=26·67%.

These tables show in statistical form the site of the lesion found to be present on removal of 214 internal

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* An address delivered before the American Academy of Orthopædic Surgeons, Chicago, on Jan. 9th.

and 81 external cartilages, and also the percentage in which no lesion of the cartilage could be demonstrated. Of the 255 cases in which a definite lesion was seen 50·59 per cent. were lesions of the posterior half of the cartilage, and 26·67 per cent. an extension of this into the anterior segment, which when complete showed the intercondylar displacement of a section of the cartilage, the anterior and posterior attachments being intact. Fracture or detachment of the anterior half occurred in only 21·18 per cent. of the cases.

It is to be noted in reviewing my cases that not only is the internal more often damaged than the external cartilage, but the inner side of the knee is also more frequently the site of pain and tenderness as a result of strain of other structures. For an explanation of this we depend on a knowledge of the anatomy and physiology of the joint, and an appreciation of the relation of the parts during its complex movements.

Lesions of the Intra-articular Cartilages

Not infrequently a patient will open his consultation with the statement that he has "slipped a cartilage" whereas close investigation reveals no such possibility. It is, however, on a correct diagnosis of the condition of the intra-articular cartilages that successful treatment will frequently depend. A lesion of an intra-articular cartilage may be confidently diagnosed if there is a history of recurrent locking of the joint with pain and tenderness limited to the attachments of one of the cartilages, the joint being normal in function in the intervals between the acute attacks, and no X ray evidence of any abnormality is present. On exploration of the joint, one may find a lesion of the anterior half or a bucket-handle displacement—in which case I believe that it is sufficient to remove the obviously detached portion. If no abnormality is seen, the condition of the posterior portion of the cartilage can only be known by its removal. A lesion of the posterior half is proved if, with peripheral detachment of the anterior half, and slight traction, the main body of the cartilage becomes displaced into the centre of the joint. This would not occur with a normal cartilage. This in my experience is the most common lesion. It would appear to arise as a result of abnormal strain of the flexed knee. This causes a disturbance of the normal relations of the parts, and with the protective action of the muscles coming into play, the posterior segment of the cartilage is nipped, torn, or separated from its peripheral attachment.

Not infrequently a longitudinal tear rather than a *separation* of the true attachment occurs. This means that, after the operation described, a portion of the periphery of the posterior segment of the cartilage is still present, and its attachments may have been loosened as a result of the original injury. As a rule the joint gives no further trouble, and I am inclined to be satisfied when I have dealt with the main lesion. I have, however, notes of several cases in which a recurrence of symptoms necessitated the removal of this portion. I have also notes of cases in which we had a typical history of recurrent displacement of the internal cartilage, and on exploring the joint no lesion of this structure was found. In these cases, if I am perfectly satisfied with my diagnosis, I always explore the outer side of the joint, as on several occasions the patient has very definitely referred all his symptoms to the inner side of the knee when the external cartilage was the site of the lesion.

Another condition which may complicate the question is the fact that both cartilages may have been torn. We know in taking our history that the patient is often indefinite about the side of the joint to which pain was referred at the time of injury, and with recurrent displacements it may also vary. In these cases I always make the diagnosis on the site of tenderness after a recent injury. If the case is seen some time after injury, and no local tenderness is present, I will not operate, but request that the knee be tested and the patient referred for further examination as soon as possible after the next injury. If after a recent injury I find tenderness limited to the line of the inner or outer side of the joint, I advise operation accordingly. That this is not always a safe procedure is illustrated by the following case: A footballer was referred to me with the diagnosis of recurrent displacement of the external cartilage. At the time of my examination tenderness pointed definitely to a lesion on the inner side of the joint, and at operation I found a typical bucket-handle displacement of the internal cartilage, and after its removal closed the joint. It was reported to me that the knee had given way and again locked when the patient was getting out of bed prior to discharge 14 days later. Pain and tenderness were now referred to the outer side of the joint, and exploration revealed a similar lesion of this cartilage. Since operation the knee has resumed and retained normal function. Many of the cases are professional association football players—a game which necessitates abnormal strain of the knee-joint, and my experience is that where the lesion is confined to the cartilages the removal of one or both does not interfere in any way with their athletic activities.

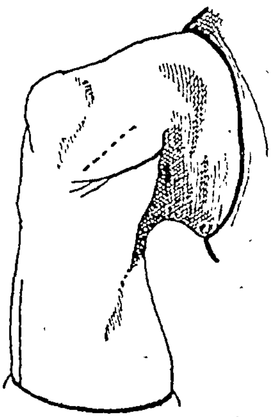

FIG. 1.—Incision advised to obviate complications following division of the patellar branch of the internal saphenous nerve.

To ensure a perfect result I attach considerable importance to the incision used for the removal of the internal meniscus. Care must be taken to avoid division of the patellar branch of the internal saphenous nerve. My attention was first drawn to the importance of this in 1916, when I removed what appeared to be a tender scar which had followed removal of an internal cartilage. The patient returned to France, but reported three months later that he was unable to ride because of pain referred to the femoral condyle on gripping the saddle. Examination revealed a tender nodule at this site which on removal proved to be a neuroma on the patellar nerve branch of the internal saphenous nerve. Since this I have on 12 occasions removed a neuroma of this nerve because of pain following a previous operation for exploration of the inner side of the joint. When this sequela occurs the nerve should be dissected free and avulsed rather than divided, so as to prevent recurrence of symptoms. The essential feature of the incision which I use for removal of the internal cartilage is that it runs parallel with this nerve and allows of its retraction before the capsule is incised. This has the advantages that we cannot get a painful neuroma in the scar or the anæsthesia commonly complained of in the area of distribution of the patellar branch of the internal saphenous nerve. Both are points of great importance in the case of professional footballers, as unless the knee feels absolutely normal confidence in it is unduly delayed (Figs. 1 and 2).

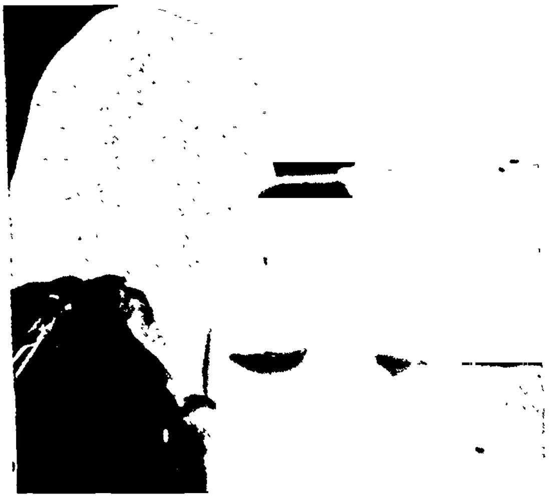

FIG. 2.—Showing avulsion of neuroma of patellar branch of] internal saphenous nerve.

Congenital Abnormalities of the External Cartilage

Before leaving the subject of injuries to the intra-articular cartilages, I wish to refer to congenital abnormalities in the form or attachments of the external cartilage. These are not so very uncommon. Included in this series of 81 cases of external cartilage lesions operated upon are 8 cases—i.e., ten per cent. —in which the history and operative findings suggested a congenital abnormality. The history is usually one of trouble with the knee in early childhood. Not uncommonly this takes the form of an audible snap or "clonk," which appears to be associated with the outer side of the joint on extension. There is seldom much effusion. The condition gives the child little trouble, and at this time the question of operation is frequently delayed. In other cases no symptoms become evident until the child takes part in active games, when apparently without due cause symptoms suggestive of cartilage displacement may arise. The condition is not infrequently bilateral. The following histories are typical, and include the two types of abnormality which I have found present.

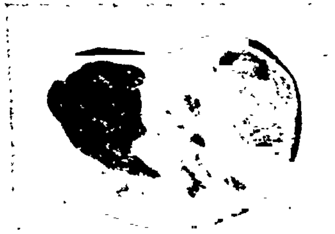

FIG. 3.—Specimen showing congenital abnormality of external semilunar cartilage. The longitudinal split in the posterior half is the result of a recent injury.

CASE 1.—History. Mr. R. was aged 43 when first seen in February, 1931. Left knee: When 9 years old the knee commenced to give way frequently, and a very temporary painless locking occurred. As a result of this he was unable to take part in games. The trouble persisted, and at the age of 19 years locking became more frequent, and was accompanied by pain at the back or outer side of the joint. The last occasion was three weeks previous to examination, when locking persisted for two days. Right knee: The first trouble occurred eight years prior to examination—i.e., when aged 35 years. When turning over in bed with the knee relaxed he felt a sudden pain on the outer side of the joint, and could not straighten it. This happened four times in that year, and was relieved on each occasion after manipulation of the joint under an anæsthetic. The knee had locked on only one occasion since then, but he had worn a bandage constantly and exercised great care in movement.

Clinical examination: Both joints had perfectly free movements, but some pain was referred to their outer sides on forcing flexion and internal rotation. There was no local tenderness apart from slight tenderness over the attachments of the posterior third of the outer cartilage of the left knee. The X rays revealed no abnormality. Operation: The condition found at operation was: on the left side the external cartilage consisted of two fusiform fibrocartilaginous bodies representing the anterior and posterior segments of the cartilage. These were united in the middle by fibrous tissue. They appeared to have no peripheral attachment, but the cornua had slender fibrous attachments to the neighbourhood of the spine of the tibia. The external cartilage of the right knee had a similar form, but the posterior segment had been displaced in front of the condyle of the femur. As a result of the removal of these structures this man, at the age of 44, was enabled to take part in ordinary games for the first time without trouble.

CASE 2.—This case illustrates the second type of abnormality. I have found it present in three cases, in one of which it was bilateral. The case, from which I show the specimen removed, was operated on in my service by Mr. A. M. Hendry on Dec. 8th, 1933 (Fig. 3). The patient, a woman aged 31, was first seen on Nov. 23rd, 1933.

History: Her history was that as a child she had some indefinite trouble with the right knee. Six years ago she had a direct injury to the knee, and since this had occasionally had pain referred to the back and outer sides of the joint on twisting it, accompanied by temporary difficulty in obtaining full extension. Nine months ago she commenced to get aching pain in the knee and had been unable to straighten it fully since. On examination all movements were free, except extension which was limited by 30 degrees. Definite tenderness limited to the line of the external cartilage was present. X ray did not show any abnormality of the joint. Operation: At operation on opening the outer side of the joint it was at once noted that the cartilage was abnormal. It consisted of a complete flat disc about one-fifth of an inch thick, extending from the periphery to the centre of the joint. On dividing the peripheral attachment of the anterior third, the complete disc was readily displaced in front of the condyle. The appearance of the peripheral portion.

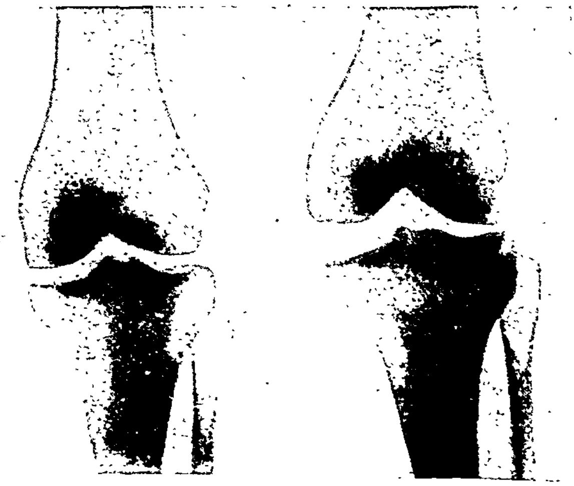

FIG. 4.—Radiogram showing laxity of knee-joint due to rupture of internal lateral ligament.

of the posterior two-thirds suggested that its attachments had been previously ruptured. Division of the attachment in the neighbourhood of the spine of the tibia allowed removal of the complete disc. It is to be noted that although the articular surface of the femur was separated from direct contact with that of the tibia, the radiograms showed no abnormal widening of the joint space.

I have removed an external cartilage from the knee of a child of 4 because of the anxiety of the mother, and from experience of cases in later life I would suggest that operation is advisable in young children if symptoms suggestive of a congenital abnormality of this cartilage are present. The presence of these abnormalities suggests that the condition of cystic degeneration of the external cartilage may also be congenital in origin.

Although inability to extend the knee completely is not uncommonly noted after disturbance of the normal relations of an intra-articular cartilage, we find that it is also one of the most common sequelæ of any severe injury of the knee-joint. Where this is not caused by a definite intra-articular obstruction, the position of slight flexion is due to the instinctive effort of the patient to avoid pain in many conditions which may simulate a lesion of an intra-articular cartilage. Again we find the inner side of the knee more frequently the site of pain than the outer. This side of the joint would appear to be more liable to strain because of the normal inclination inwards of the femur on the tibia, the greater range of movement of the inner condyle of the femur, and the fact that the outer side of the joint is more exposed to the application of external forces.

Lesions of the Lateral Ligaments

Strain of the internal lateral ligament is in my experience five times as common as that of the external lateral ligament, but it is more rarely completely ruptured. The symptoms may closely resemble those of a cartilage lesion. There is severe pain referred to the inner side of the joint—a feeling of something tearing, and pain on attempting to straighten the knee fully. This limitation of extension differs from the locking due to a cartilage displacement in that it disappears under anæsthesia, and would seem to be associated with the fact that the ligament being taut in extension, the position of relaxation is instinctively adopted to obviate strain of its attachments. In reviewing 34 consecutive cases of severe strain of this ligament, none was associated with a lesion of the cartilage requiring operative treatment, except one in which the anterior crucial ligament was also ruptured. Strain of the internal lateral ligament is accompanied by tenderness in the line of the internal cartilage (Fig. 4), but the maximum tenderness is usually over one or other of the attachments of the ligament, most frequently the femoral. The treatment consists of pressure over this point, slight elevation of the heel of the boot to maintain relaxation, elevation of the sole and heel of the boot on the inner side to divert body-weight to the outer side of the joint, with electrical treatment to restore the tone and volume of the vastus internus muscle. Treatment on these lines must be continued until local tenderness has entirely gone, and no pain is elicited on forcing any movement. If the joint is subjected to strain before its normal control and movement have been established, recurrence of the same strain of symptoms is to be expected, and suspicion of cartilage injury again aroused. Lesions of the external lateral ligament are less common than those of the internal lateral ligament. In my experience it is most frequently completely ruptured, when surgical treatment is necessary to restore stability of the joint.

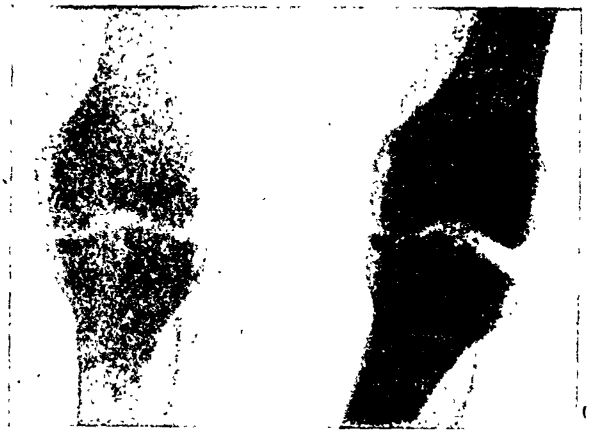

FIG. 5.—Radiogram showing laxity of knee-joint due to rupture of external lateral ligament.

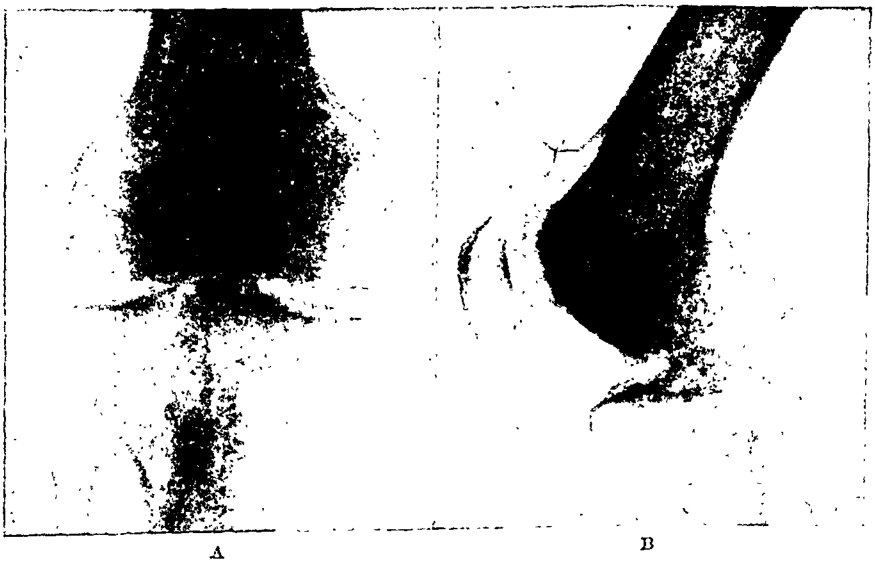

FIG. 6.—Radiograms showing loose body impacted in intercondylar notch; (A) front view, (B) lateral view. Removal necessary to allow extension of joint. (Author's case.)

Following a severe strain traumatic exostosis or ossification in the ligaments may occur as a result of new bone formation at the site of rupture. This will as a rule be demonstrated by radiograms. If the stability of the joint is good as a result of conservative treatment, they should be dealt with surgically only if they give rise to trouble. Cases of recurrent disability following strain of a lateral ligament may, however, occur in which the X ray reveals no injury to the bone—so that if tenderness definitely localised to the attachment of the ligament persists after appropriate conservative treatment, the question of exploration of the tender area should be considered. A lady, the wife of a doctor, and aged 28, stated that since severely twisting the knee three years previously she had been unable to take part in sports because of a severe pain referred to the inner side of the knee if it was subjected to strain. Examination revealed a definitely tender point over the inner condyle of the femur, and pain was referred to this point on forced abduction and external rotation. The X ray was negative. On exploring the tender area I found a tiny sharp spicule of bone with a bursa around it. Since removal of this spicule of bone she has had no recurrence of trouble in the knee.

Perhaps the next most common condition to simulate lesions of the semilunar cartilages is the presence of loose bodies in the joint. They may be due to a number of causes, including traumatic separation of a portion of the articular cartilage—separation of osteophytes, or osteochondritis of the internal condyle. The X rays will usually establish the diagnosis. The symptoms usually differ from the cartilage displacement in that the locking is very temporary, the body being nipped and immediately displaced from the position in which it obstructs movement, and the site of pain is variable. The history will also reveal that the knee has not always felt just as good as the other prior to the commencement of definite symptoms. Some limitation of extension of gradual onset may occur as a result of an accumulation of loose bodies in the posterior aspect of the joint, but where a sudden and persistent limitation of extension occurs it has in my experience always been due to a moderately large body becoming wedged in front of the attachments of the crucial ligaments. When it is in this position manipulation will fail to dislodge it, and operation is necessary for its removal. I show you the X rays of the last case on which I operated for this type of locking (Fig. 6, *a* and *b*). It is interesting in that it illustrates changes in the joint following a fracture of the patella 18 years ago. Lieutenant H. was shot down when flying in October, 1915. Seven months later he presented himself at Shepherd's Bush Hospital with a comminuted fracture of the upper part of the patella, with 2½ in. separation of the main fragments, so that voluntary extension of the leg was not possible. At operation the smaller fragments were removed, and continuity of the main fragments secured by wire suture. The wound broke down, the wire was removed, and he left hospital some months later wearing a knee cage, and gradually developing an increasing range of movement. I saw him again in October, 1933, when he told me that although he had never been able to flex the knee fully, he had played golf and tennis regularly without trouble until June of that year, when he began to feel something catching in the joint, which, apart from slight effusion and annoyance caused little disability. Fourteen days prior to my examination he reported that when going down stairs the knee jammed, and he had been unable to straighten it since. On examination one could feel lipping of the articular margins, and the movement of extension was blocked 30 degrees short of this position. The X ray revealed a loose body in the intercondylar notch, and also numerous marginal osteophytes, particularly round the patella. The body was exposed, and as a matter of interest it was noted that it could not be displaced by manipulation. Since its removal the joint has recovered its pre-operative range of movement.

Lesions of the Extensor Apparatus

Lesions of the extensor apparatus of the knee-joint may be diagnosed when although the patient is unable fully to extend the knee voluntarily, painless passive extension is possible. On palpation the point of tenderness will indicate the site of the lesion. The following lesions may occur: separation of the tibial tubercle, detachment of the ligament from the lower border of the patella, transverse fracture of the patella, or separation of the quadriceps tendon from the upper border of the patella. The site of lesion will depend on the relation of the patella to the condyles of the femur when the protective action of the quadriceps comes into play. As a result of the strong contraction of this muscle, considerable separation of the fragments may occur at the site of rupture, so that surgical treatment is usually necessary. These observations as to the site of lesion are based partly on experience of mobilisation of knee-joints in war surgery, but also on the fact that three consecutive cases of rupture of the quadriceps attachment to the patella occurred in gentlemen late in the evening, at a time when their cerebral control of muscle action might have been somewhat delayed. Perhaps earlier in the evening the protective action of the quadriceps might have been more prompt, and no lesion or perhaps fracture of the patella would occur. The contractile power of the quadriceps presents the real difficulty in maintaining apposition of the structures at and after operation. In cases of fracture of the patella wire sutures are not infrequently used, and we are apt to depend on suture by heavy chromised catgut or kangaroo tendon to maintain attachment of a ruptured quadriceps tendon to the upper border of the patella.

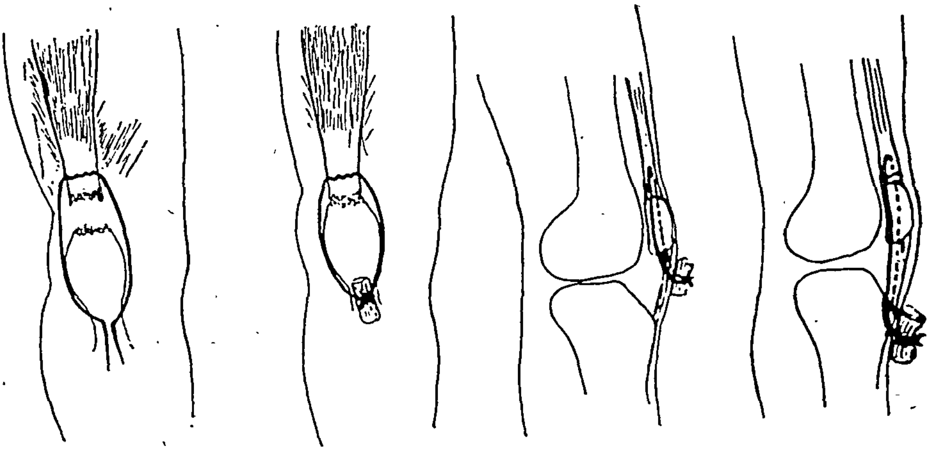

FIG. 7.—Diagram showing tension suture used in repair of rupture of the extensor apparatus.

In my experience these methods have been open to grave objections. We know that nature resents the presence of foreign, unabsorbable materials in the tissues, whether these are vaselin, metal screws, plates, or wires, and that sooner or later a local inflammation results, necessitating their removal. I will refer to one case which clearly demonstrates this. Just before our military hospital in Birmingham was closed a pensioner reported for treatment because of a discharging sinus in front of the patella. His record card showed that he had sustained a simple fracture of the patella, which had been treated by operation ten years previously. For nine years he had worked regularly, and the knee gave no trouble. Then local inflammation occurred, the operation scar broke down, and a sinus persisted. A radiograph was taken, but this did not show the presence of a wire or other foreign body. It was decided to excise the sinus, and during the operation we found a plaited band of silkworm gut sutures partly embedded in the bone. With the removal of these the wound healed. On several occasions in which I have used strong chromised catgut or kangaroo tendon, mild local inflammation with evacuation of portions of the suture material has occurred. I believe also that tight suturing at the site of lesion diminishes the blood-supply and delays repair of the tissues. I have found that these difficulties may be obviated by a simple expedient which removes the pull of the contractile power of the quadriceps from the suture line (Fig. 7). The accurate repair of the lesion can then be established by fine catgut sutures. The method we adopt is to pass a pliable phosphor-bronze wire in a sinuous course transversely through the quadriceps tendon. The ends, on separate needles, are passed down the lateral borders of the patella and emerge through the skin in close proximity either below the patella or at the level of the tibial tubercle. In most cases it is sufficient to tie this wire suture over a pad of gauze at the level of the lower border of the patella. Occasionally, when much tension is necessary, it is advisable to pass the wires in opposite directions through a hole drilled in the tubercle of the tibia, when they are drawn tight and tied over a pad of gauze which protects the skin from pressure. At the end of two to three weeks the wire is divided and easily withdrawn.

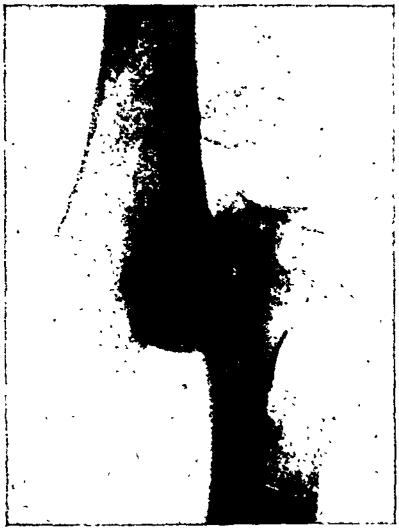

FIG. 8.—Case of complete dislocation of the knee treated by conservative means. Radiogram showing the injury.

Rupture of the Crucial Ligaments

Complete dislocation—One of the most severe disabilities following injury of the knee-joint is loss of antero-posterior stability of the joint following rupture of one or both of the crucial ligaments. These cases are usually associated with injury to the internal lateral ligament and one or both cartilages. The operation advised by Alwyn Smith and Hey Groves offers an ingenuous method of replacing these ligaments by fascial and tendon transplantation. My experience of the operation has been that stability of the joint was definitely increased, and that for several months it appeared to be almost a perfect success, but later examination always showed the presence of a degree of antero-posterior movement which did not justify the removal of splintage. I have always had the feeling that the removal of a troublesome meniscus was not an unimportant factor in the patient's satisfaction with the result obtained.

Apart from dealing with lesions of the cartilages or lateral ligaments if present, my practice is to treat lesions of the crucial ligaments on conservative lines. Where a fracture of the tibial spine blocks extension, this can usually be overcome by gradual splintage or manipulation, and although theoretically full extension may not be the ideal position for the treatment of these lesions, in practice it has given excellent results. In orthopædic surgery more than any other branch of the art, a knowledge of what nature can do is necessary to temper our judgment, and to assess the proper value of our procedures. This is well illustrated by a case of complete dislocation of the knee which came under my care last year (Fig. 8). I first saw him six weeks after his injury. The history of the case is: A workman, E. B., aged 40 years, sustained a complete dislocation of the knee, the femur being displaced backward on the tibia as a result of a heavy pipe falling on its lower end. Under general anæsthesia the dislocation was reduced, a pressure bandage applied, and the leg rested on a pillow, and steadied between sandbags. Five days later the effusion was aspirated, massage commenced, together with electrical treatment, and contractile exercises for the quadriceps. At the end of a fortnight limited active movements of the joint were encouraged. Four weeks after the accident he commenced to walk with a stick without splintage, and two weeks later he had 90 degrees controlled movement of the joint from extension, and could walk without limp or pain. The X rays show the dislocation, an injury which must have caused complete rupture of both crucial ligaments. The photographs taken ten weeks after the accident show no instability with the patient bearing his whole body-weight on the injured limb, with the knee in a position of flexion (Fig. 9, *a*, *b*, and *c*). To-day, 18 months after the accident, there is no clinical abnormality of the joint. Joseph Mitchell [9] has reported similar cases.

Traumatic Arthritis

We have dealt so far with injuries in which a definite pathological lesion can usually be demonstrated, but in reviewing a series of cases of injury of the knee-joint we all find a large number in which disability persists, although no definite lesion of the joint structures has occurred. This will include many in which movement remains limited as a result of a traumatic and/or toxic arthritis following the injury. We recognise that direct or indirect trauma of the shoulder-joint is not infrequently followed by a painful limitation of movement of the joint. This is more common in patients past middle life, and they usually have a toxic diathesis. Probably the main fact that saves them from operative treatment is that the X ray is negative, and that there are no intra-articular fibrocartilages in the shoulder-joint. In the case of the knee-joint, however, the possibility of a cartilage lesion makes the diagnosis more difficult, and I know I have many times in my earlier days removed normal cartilages as a result of faulty diagnosis. Fortunately the operation is helpful in that the convalescence ensures rest of the joint, which is one of the essential lines of treatment of the condition. The fact that after operation the patient usually still complains of pain in the joint on full extension, and does not make the usual quick recovery of movement, also draws our attention to the importance of investigation of a possible septic focus. With appropriate treatment of this, and the local joint condition, a complete recovery of function usually occurs. When you are dealing with a primary lesion of the knee-joint the history of injury may be such as to make cartilage displacement possible, and the persistent limitation of and pain on forcing full extension of the joint make this seem most probable. I have seen it in a girl of 26 in which the doctor reported to me he had reduced a dislocation of the knee six weeks previously, but extension was still limited. I manipulated the joint, but the pain of treatment in full extension necessitated removal of splintage, and operation for removal of the internal cartilage was advised. At operation the pink injected margin of the articular cartilage was noted, and removal of a normal internal semilunar cartilage did not allow painless extension of the joint. The possibility of this condition must always be borne in mind in dealing with limitation of extension following a primary injury of the knee-joint. Tenderness may appear to be more marked on the line of the internal cartilage, but if the articular margins of the condyles of the femur are also tender, and pain is present both on forcing flexion and extension our prognosis should be guarded. Operation should be advised only in cases in which the nature and severity of the injury suggest the probability of the complication of cartilage displacement. Manipulation during the period of inflammation is useless, but when pain and all local tenderness have gone, it may be utilised to establish a full range of movement.

Manipulative Surgery

The knee is perhaps second only to the spine as a field for the activities of the manipulative surgeon, but it is amazing to me how seldom we who deal constantly with joint injuries have occasion to employ it. It should always be utilised to ensure full extension of the knee when displacement of a cartilage is the probable cause of limitation of this movement, except in cases of recurrent displacement, when the diagnosis is clear. In these cases the patient should be advised to have the cartilage removed by operation, which is the only means of preventing recurrence of the trouble. I find that at least 90 per cent. of the professional footballers on whom I have operated have previously had their joints manipulated by a bone-setter. The majority of the cases which they cure are, however, cases of joint strain which have recovered from the usual reaction of a joint to trauma or mild arthritis, but the patient still complains of pain on certain movements. During the stage of active reaction forcing of movements can do nothing but harm, but there does come a time following injury at which forcing of movements, although painful at the moment, may be dramatically effective in its results. It will not, however, usually be necessary if other measures have been adopted to restore the fullest possible range of painless movement.

The volume of recent literature dealing with injuries of the knee-joint is a sure indication that the question of their diagnosis and treatment has not yet been standardised. This is probably due to the fact that the frequent association of injuries makes the presentation of the clinical picture and the assessment of the value of statistics difficult.

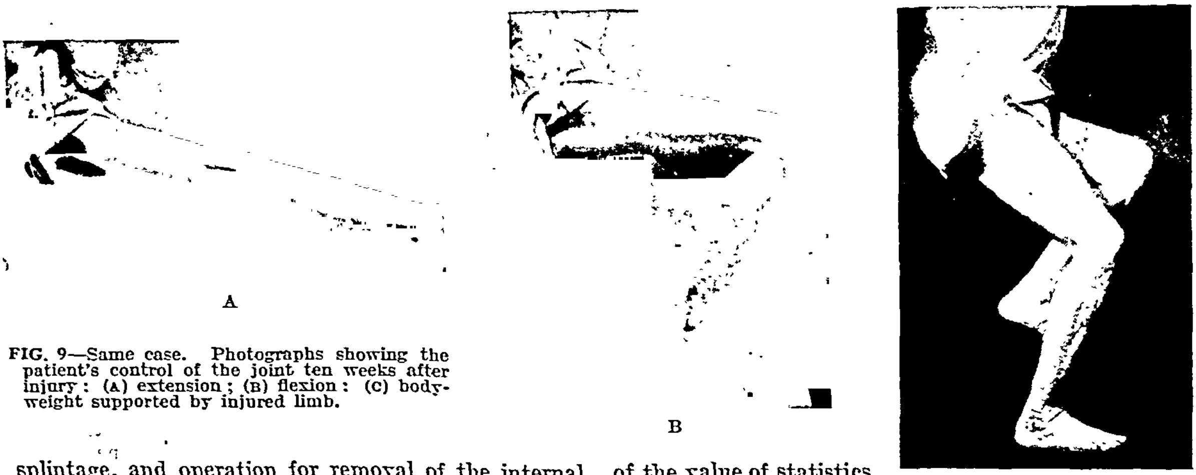
A B C

FIG. 9—Same case. Photographs showing the patient's control of the joint ten weeks after injury: (A) extension; (B) flexion: (C) body-weight supported by injured limb.

These observations on some of the common injuries of the knee-joint are offered so that we may by our discussion help to clarify some of the problems which we all meet.

I am much indebted to Mr. A. M. Hendry for his help in reviewing the cases, and to Dr. Brailsford for preparing the slides and photographs.

Summary

1. That damage to an intra-articular fibrocartilage occurs in almost 50 per cent. of severe injuries of the knee-joint. 2. That the posterior segment of the cartilage is most frequently the site of the primary injury. 3. That lesions of the external semilunar cartilage are relatively more frequent than published statistics would suggest. 4. That congenital abnormality of the external cartilage may frequently be diagnosed in childhood, and should be dealt with surgically. 5. That a loose body causing a sudden persistent irreducible limitation of extension is wedged in the intercondylar notch. 6. That in repair of lesions of the extensor apparatus muscle pull should be overcome by a removable suture. 7. That the results of operation for repair of rupture of the crucial ligaments are uncertain, and that a complete recovery of function may take place as a result of conservative treatment. 8. That while accurate diagnosis of an original injury may be difficult, the cause

of a recurrent lesion can usually be established as a result of a carefully taken history, together with clinical and X ray findings. 9. While conservative or manipulative treatment is successful in many cases, a surgical exploration of the joint will always be necessary for the cure of a large number. 10. In the surgical approach to the inner side of the knee, incisions which may divide the patellar branch of the internal saphenous nerve should be avoided.

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THE RÔLE OF THE LIVER IN THE METABOLISM OF CARBOHYDRATE AND FAT *

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III.—THE DEPOSITION OF LIVER FAT

In the first lecture of this series the evidence that the liver is an important site of formation of the ketone bodies was briefly reviewed. The rapid disappearance of these substances from the blood of diabetic animals after removal of the liver, their formation from long chain fatty acids with an even number of carbon atoms in the perfused liver, and the behaviour of these fatty acids when incubated with liver slices, furnish the main points which permit us to attribute to this tissue a special significance in the oxidation of fatty acids. I will not attempt to discuss this phase of the subject in detail or to review the evidence for the attractive hypothesis that fatty acids are desaturated in the liver. It appears at present that selective retention by the liver cells of the more unsaturated fatty acids may provide as satisfactory an explanation of the facts observed as does desaturation. Recent work indicates that the double bond may not always be the point of rupture of the fatty acid chain.

The excessive increase in the neutral fat of the liver, the so-called "fatty infiltration," and the change in the physical characteristics of the fat with more or less extensive damage to the liver cells, the so-called "fatty degeneration," are the most striking phenomena encountered in a superficial study of the rôle of the liver in the metabolism of fat. The multiplicity of conditions in experimental work and clinical studies with which excessive deposition of fat in the liver may be associated indicates either that these conditions produce some effect common to all of them or that one of the most easily disturbed properties of liver cells is their ability to deal with fat.

Little information is available on the effect of different fatty acids in the production of fatty livers. Miss Ridout and I found that certain saturated fats tended to produce greater deposition of liver fat than unsaturated mixtures. On the other hand, two fatty materials, butter and beef dripping, iodine numbers 32 and 40, varied greatly in this regard. Beef dripping was much more effective than butter. We soon realised, however, that among the significant factors the choline content of these mixtures must be considered, and that until this had been determined the effect of unsaturation or of the number of carbon atoms of the ingested fatty acids on the deposition of fat could not be decided. It is now known that the amount of depôt fat influences the extent of the deposition of fat in the liver during starvation (Mottram; Dible). A complete statement of the conditions which lead to these changes is unnecessary, but I may remind you that they are observed in the first stage of starvation, and are easily produced in the livers of young animals of many species by diets rich in fat. The amounts required to produce similar effects in adult animals of some species, the dog for example, are much greater. Prominent among the list of substances which may induce these fatty changes are cholesterol, alcohol, phloridzin, chloroform, phosphorus, carbon tetrachloride, and phenylhydrazine. Bacterial toxins may cause an unmasking of the liver fat and also an increase in the amount. Extensive fatty changes are, of course, characteristic of experimental and clinical diabetes in the absence of insulin. Pregnancy in rabbits may be accompanied by fatty changes (Mottram), but in the experience of Huntsman and MacLean in my laboratory these are seen much more frequently in rats. Pernicious anæmia, yellow fever, acute yellow atrophy, eclampsia, and poisoning with some of the chemicals listed above are among the many clinical conditions in which "fatty livers" are encountered.

The mechanism of production of these fatty changes is obscure, but it is fascinating to speculate, as Fischer and Hooker have done, that in many of these conditions the alkali reserve of the liver cells may be decreased. While there is no direct evidence for this hypothesis it is worthy of extensive investigation. Experiments in which ammonium chloride has been fed to rats have thus far provided no support (Huntsman). I will not attempt a comprehensive discussion of these fatty changes but will take the opportunity of presenting to you a series of results which, even if their physiological importance should prove to be slight, have served to attract to this fascinating field a new group of workers. This study of certain of the factors which control the deposition of liver fat is an outgrowth of the insulin investigation in Toronto and may be said to have its inception in the work of Allan, Bowie, Macleod, and Robinson,[1] who found it necessary to provide fresh pancreas in the diet of depancreatised dogs in order to enable the animals to live for more than five or six months under the prevailing experimental conditions. When pancreas was not provided the animals eventually died, and at autopsy presented very fatty livers as the outstanding—and in some cases the sole—abnormal feature. I think the story will be somewhat clearer if I state at this point that results have recently been obtained which suggest that some influence is affecting the liver cells of these diabetic animals which prevents them from performing their normal functions, before there is an obvious or even a detectable increase in fat.

The evidence for this statement is based upon study of liver tissue in several animals which were apparently in the same condition, in so far as rate of sugar production by the liver was concerned, as others in which abnormal amounts of liver fat were found. The usual history of the diabetic dogs is that after pancreatectomy they excrete large amounts of sugar on a fixed diet and dosage of insulin, but that the glycosuria becomes less and less, until little or no sugar is present in the daily urine samples. If a sample of liver is then obtained, the total fatty acid plus unsaponifiable fraction may not be abnormally high. Some animals may excrete little or no sugar on a low insulin dosage for several months without exhibiting this excessive deposition of liver fat.

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* Three lectures delivered for the University of London at University College on Jan. 11th, 15th, and 18th.

This finding might easily have been overlooked for a much longer period of time if we had not adopted the practice of obtaining evidence by analysis of liver tissue obtained at biopsy rather than depending upon the insulin requirement, the excretion of sugar and bile-pigments, on the results of liver function tests and on the general health of the experimental animal, as indices of the state of the liver cells. This falling off in sugar excretion is not due to depletion of the glycogen reserves. Our attention has, of course, been focused on the anterior pituitary and this gland is being carefully examined in the hope that the histology may suggest the state of its activity under these conditions. Another possibility, which is difficult to eliminate, but for which we have obtained no evidence, is that a few islet cells have regenerated. The most likely explanation appears to be some change in the liver cells which proceeds and possibly predisposes them to the fatty changes.

In many of these animals large amounts of fat eventually accumulated in the liver. The diet which they received was low in calories—300 g. lean beef, 100 g. sucrose. It was found, as stated above, that the accumulation of liver fat in these diabetic dogs did not occur when fresh pancreas, 100 g. daily, was provided.

Macleod and his co-workers naturally considered the possibility that pancreatic lipase might be concerned in this effect, and this feeling was perhaps strengthened when the fatty livers were not observed in animals which received a commercial lipase preparation. This material is usually prepared by "defatting" the minced glands with acetone, a procedure which does not remove more than a small amount of the phospholipoid. Prof. Macleod was primarily interested in the metabolism of carbohydrate in these diabetic dogs but he provided facilities for Hershey to continue the investigation of these fatty changes. The problem was to determine the constituent of the pancreas responsible for the effect. The great difficulty in this very tedious type of experimentation is that the dogs exhibit vitamin deficiencies and it is usually not feasible to provide highly purified fractions in the large amounts necessary. The possibility that the phospholipoid fraction might be exerting an effect on liver fat was made prominent by Leathes' emphasis on the probable significance of these substances in fat metabolism. Since it was not feasible to prepare this material from pancreas, a commercial phospholipoid fraction from egg yolk was first investigated by Hershey.[2] These experiments were continued in the Department of Physiology from 1926 to 1932 and the results (Hershey and Soskin; Best and Hershey) eventually convinced us that the phospholipoid fraction from egg yolk not only exerted an effect comparable to that of the fresh pancreas, as the original findings had indicated, but that the action of the former material was not due to the vitamins which it contained. In subsequent experiments upon these diabetic dogs, vitamins (Bemax, activated ergosterol, and tomato juice) have been provided.

The onset of fatty changes in the liver, apparently similar to those previously studied, can be produced relatively rapidly in most of these animals by adding fat to the diet. We studied many dogs before we encountered one which would retain large amounts of ingested fat without exhibiting these characteristic changes in the liver cells. An animal which is remarkably resistant to these effects of a diet rich in fat has been encountered recently. Experiments upon diabetic dogs are very tedious, and in the search for more satisfactory test objects for these effects produced by the phospholipoid fraction we found that normal white rats could be used (Best, Hershey, and Huntsman). Some component of this material prevents the deposition of fat in the liver, which takes place when rats weighing between 150 g. and 250 g. are placed on a diet containing 40 per cent. beef suet. In the search for the active component of the phospholipoid Miss Huntsman and I found that this was choline, and we have had occasion to use choline to prevent deposition of fat in the livers of rats in a large number of experiments.

The chemical results of a certain group of these experiments are summarised in Table I. The figures in this table show that the livers of animals fed upon a stock diet with 40 per cent. added fat contain on the average 14·2 per cent. fatty acid plus unsaponifiable material, while those which have received what may be considered an adequate dose of choline have an average value of 4·5 per cent. It is satisfactorily established, therefore, that choline possesses the property of preventing deposition of fat in the rat's liver under the conditions of these experiments.

TABLE I

Stock diet plus fat (fat 40 per cent. of total food) for 21 days.

No. of rats.	Choline daily. mg.	Fatty acids of liver per cent.
203	—	14·2
109	75	4·5

To make sure that this effect of choline in rats was not a quite different matter from the action of the phospholipoid fraction in diabetic dogs, Ferguson, Hershey, and I[3] investigated the effects of choline in these latter animals.

In some dogs the sugar excretion is apparently greatly increased by choline administration, and there is reason to believe that deposition of fat in the livers of these animals, or perhaps better, the development of the condition which leads to decreased sugar excretion, is prevented by choline. It is always more satisfactory to demonstrate the change produced by a substance in an individual animal and not to rely upon the differences exhibited by a series of control and test animals. This is particularly important in these experiments with diabetic dogs because it is seldom possible to use more than a limited number. Evidence based upon direct examination of liver tissue (Best, Ferguson, and Hershey) in an individual animal has been presented which appears to demonstrate that choline is effective in decreasing the fat content of the liver. In this particular animal chemical analyses made on a section of liver secured on a certain date revealed the presence of 20·6 per cent. fatty acid. The diet and insulin dosage were maintained at a constant level. Choline was provided and one month later another section of liver was secured. The content of fatty acid was 6·7 per cent.

This result appears to provide satisfactory evidence that choline is effective under certain conditions in decreasing the fat content in the liver of a diabetic dog and suggests that the action of choline is curative as well as prophylactic. It is reassuring that Miss Huntsman and I have been able to demonstrate what appears to be a similar phenomenon in rats. It has been possible to show that choline not only prevents the accumulation, but also causes the disappearance of excess fat from the livers of rats.

In the first curative experiment the control animals with fatty livers were allowed to remain on the diet rich in fat. The test animals received choline. At the end of 21 days the test animals had a normal content of liver fat, while the livers of the controls were uniformly fatty. In the second experiment the control animals received, instead of the diet rich in fat, the stock diet composed of mixed grains. The test animals received the same amount of the grain diet and, in addition, choline. The figures show that the fat disappeared more rapidly from the livers of those animals which received the added choline.

More recently Miss Huntsman and I have conducted a different experiment.

Fatty livers were produced in a large group of rats by feeding fat in the customary manner. The control animals were then placed on a diet containing 80 per cent. sucrose and 20 per cent. "fat-free" casein (British Drug Houses). The 2 g. of casein which each rat received daily contained 6 mg. of fatty acid. The test animals received the same diet as the controls, but in addition 70 mg. of choline per day. The decrease in the fat content of the livers of the test animals was very rapid, but the fat content of the livers of the control animals remained at quite a high level. The interesting point arises as to whether or not the difference in the fat content of the two groups of control animals is related to the choline content of the diet which they receive. Analyses for choline made for us by Mr. Fletcher indicate that the animals on the grain diet were receiving 10 mg. of choline daily, while the animals on the sucrose and casein ration received only approximately 1 mg. of choline daily. The minimum effective amount of choline has not yet been determined accurately, since in the past we have not paid sufficient attention to the choline content of our stock diets. It appears very likely, however, from the figures which we have available, that 10 mg. per day is an effective, although not an optimal, dose for a rat under these conditions.

These results, together with those which Miss Ridout and I had obtained earlier, indicate that future experiments on diabetic dogs and normal rats should be conducted with the control animals on a choline free diet. These experiments are interesting from two other points of view, and I may have occasion to refer to them again. You will remember that Rosenfeld[4] has shown that diets high in carbohydrate may prevent the development of fatty livers in phloridzin poisoning. It is apparent from our results that choline is much more effective than a diet containing 80 per cent. sucrose and 20 per cent. casein in the elimination of the deposits of fat from the livers of these white rats. The second point to which I would like to call your attention is that these results exclude the possibility that the principal effect of choline is to decrease the rate of absorption of fat from the intestine. I will discuss this matter again later. One other result may be briefly mentioned. Miss Huntsman and I planned another experiment to determine the relative merits of a very high carbohydrate diet and of choline in the cure of these fatty changes.

Rats with fatty livers were placed on a diet composed exclusively of sucrose. One-half of the animals received choline. The livers of the sucrose fed animals became steadily more fatty until at the end of twelve days an average value of 24 per cent. was reached. The animals receiving choline responded in much the usual way and the average fat content after twelve days was approximately 5 per cent.

This unexpected increase in liver fat when the diet contains no choline provides us with further problems.

Another point which may be mentioned here is that Miss Ridout and I found, in confirmation of previous workers, that the addition of cholesterol to the diet of rats or rabbits produces very intensive fatty infiltration and degeneration of the liver. It has been shown that this change may be prevented in rats if sufficient choline is added to the diet. Much more is required in these experiments than in those in which fatty changes were produced by feeding fat. This point has not received sufficient attention from other investigators, who have stated that their results were not completely in harmony with ours. While we have not as yet had an opportunity of investigating many substances similar in chemical structure to choline, it has been shown that betaine is effective in preventing the development of fatty livers in rats which are receiving a diet rich in fat (Table II.) or in cholesterol.

TABLE II

Fat diet. Length of experiment: 21 days. 7 g. stock diet plus fat (fat 40 per cent. of total food) per rat per diem.

No. of rats.	Average change in wt. (g.).	Betaine daily. (g.)	Fatty acids in liver. (%)	Iodine No.
19 ..	+5	—	21·8	84*
20 ..	+7	0·10	4·0	104*

* Average for 10 rats only. (Best and Huntsman.)

Choline and the Fatty Liver of Starvation

Miss Huntsman has had the opportunity of securing large numbers of figures on the increase in the fat content of the rat's liver during starvation. If choline is given only during the period of starvation an effect is not clearly demonstrable, but if it is added to the stock diet for some weeks previously and during the period of starvation the accumulation of liver fat does not take place. These results suggest that some of the choline may be stored or that it is possible to affect the mechanism which controls the deposition of liver fat by the previous administration of choline. We have not as yet found it possible, however, to detect any difference in the amount of fat deposition in the livers of rats when they are placed on a diet rich in fat after they have received for a period of three weeks large amounts of choline in addition to the stock diet. The livers of the animals receiving the choline are quite as fatty as those in the control groups. It is rather difficult without using very large numbers of rats to demonstrate a definite deposition of fat under these conditions before the animals have been on this diet for six or seven days. At the end of this interval there is no difference in the fat content in the livers of the two groups. There may be a definite difference during the first few days. One would not expect that large amounts of choline could be stored.

It may be pointed out here that the total choline in a tissue can be quite satisfactorily estimated by freeing the bound choline by acid hydrolysis in alcoholic solution. The alcohol and much of the acid are removed by distillation. The choline may then be acetylated and the acetylcholine assayed against standard acetylcholine on the isolated rabbit's intestine. Fletcher will report in due course the results of choline estimations on the various tissues of rats, some of which have received choline in large amounts. The question of whether any choline exists in a free state in the body has perhaps not been settled, though the recent report of Strack, Neubaur, and Geissendörfer[5] holds considerable interest. Their results and those which have been obtained in my department suggest that there is very little free choline. Fletcher and Solandt find that beef pancreas contains approximately 200 mg. per cent. of choline. The diabetic dogs studied by Allan et al. received approximately grs. 100 of pancreas per day. If these animals had received grs. 500 or 600 of beef muscle, as many diabetic dogs do, the choline content might have been sufficient to postpone the onset of the fatty changes. On the other hand, the data we have at present available do not suggest that 200 mg., the amount available in the pancreas, would be an effective curative dose of choline. It might well be sufficient to postpone the onset of the fatty changes. There is a possibility that betaine and other substances closely related to choline may also be present in appreciable amounts in this tissue. When studies of choline content of tissues are made precautions should be taken to prevent enzymatic loss of the active material (Bernheim; Fletcher).

The Mechanism of Action of Choline

If we knew more about production of fatty livers by such agents as phosphorus or chloroform, and so forth, a lead to the mode of action of choline and betaine might be supplied. The most obvious way in which choline might affect liver fat would be to decrease the amount absorbed. However, we have never been able to obtain any evidence that fat excretion is increased by choline. Furthermore, there is no difference in the change of weight in animals with and without choline. Miss Huntsman, Solandt, and I were never able to find any change in body fat in the animals which received choline. The experiments with which Miss Ridout, Prof. Channon, and I have recently been occupied provide satisfactory evidence that there is no appreciable change in the amount or character of the depôt fat attributable to choline. The possibility still exists, however, that although the amount of fat absorbed was not decreased the rate might be affected. It is possible that the rapid absorption of fat would produce fatty livers while the slower absorption might not. Miss Huntsman and I have demonstrated that it is not necessary for the choline to be administered with the fat, and also that choline administered subcutaneously definitely decreases the deposition of liver fat. If the choline hydrochloride is given in the morning and the rat is fed once a day in the late afternoon, the effect on liver fat is easily demonstrable. None of these experimental results eliminate the possibility that choline affects the permeability of the intestine to fat. As I have mentioned previously, we have not as yet been able to secure a reliable method by which the effect of choline on the absorption of fat can be determined. Work on fat tolerance curves has been abandoned, and up to the present the amount of fat which will be absorbed in the intestine of the rat in a certain time cannot be predicted with any certainty. The results which I have quoted previously, however, show that absorption cannot be an important factor. It will be remembered that in one of the experiments the animals were placed on a diet containing very little fat, about 6 mg. per day per rat. If choline had completely prevented the absorption of fat throughout the whole experiment the maximum loss to the liver would have been 60 mg. Since the liver of the control rats contained on the average 10 per cent. fatty acid at the end of the experiment and would weigh about 7 g., each would contain approximately 700 mg. fatty acid. The livers of the test rats contained 2·8 per cent. fatty acid and would weigh about 5 g.—i.e., each would contain approximately 140 mg. If the effect had been to prevent absorption, the 60 mg. present in the diet would produce relatively little effect in view of the fact that the liver has lost approximately 560 mg. Evidence pointing in this same direction is obtainable in the experiments on starved rats. It appears justifiable, therefore, to conclude that the chief action of choline is not on the absorption of fat.

Another possibility is, of course, that the oxidation of fat in the liver is increased. Miss Ridout has thus far been unable to obtain any evidence of increased oxygen uptake in rats which have received choline, but this result throws no light on what may be happening in the liver cells. The situation at the moment is, therefore, that this easily demonstrable action on liver fat is the only established effect of choline on fat metabolism.

One will hesitate a long time before concluding that this is in reality the only action of choline, but a study of the recent data in which Miss Ridout, Prof. Channon, and I are greatly interested, also focuses attention on the liver. These data are worth considerable study, and will be published in detail in due course. With the permission of my collaborators, I will review very briefly some of our findings and deductions. When fat is provided in the diet of white rats there is an accumulation of neutral fat in the liver. An increase in neutral fat can also be produced by cholesterol feeding, and under these circumstances there is also an increase in cholesterol ester and a very slight rise in free cholesterol. The main, and perhaps the initial, effect of choline is on the neutral fat of the liver, which is reduced to very low levels if adequate amounts of the base are provided. In the cholesterol-fed animals there is also a very definite decrease in the cholesterol ester, while the free sterol is practically unchanged. Choline has apparently very little effect on the phosphatide fraction. The improvement in liver function, which in some cases follows the administration of choline to diabetic dogs, may in part be due to elimination of the excess of neutral fat from the liver cells. The amount of fat which disappears from the liver is, after all, very small, and it is not surprising that it should escape detection if it is oxidised or carried to other tissues.

The deposition of fat in the liver is due either to the fact that excess is being presented to it, that the rate of oxidation or the retention of fat by the liver cells is changed, or that the factors which normally take fat away from the liver are not operating with sufficient speed. There is no increase in blood fatty acid when the liver becomes fatty in these diabetic dogs. The effect of choline on blood fat needs further study but we have no lead in this direction as yet. One of the most important possibilities is that choline stimulates the liver cells to oxidise fatty acids. Quastel's recent report suggests that the liver slice technique may permit the investigation of this problem in the Warburg apparatus.

There is another possibility to be considered. Early in this lecture I referred to the finding that the diabetic dogs lose some of their ability to produce sugar before there is any accumulation of fat in the liver. Miss Huntsman and I are now studying the effect of choline on sugar excretion under these conditions. If positive results are obtained the possibility will have to be considered that the action of choline on liver fat is secondary to one on sugar production.

The results of these researches have, I believe, provided us with new tools by the intelligent and energetic use of which our knowledge of fat metabolism may be augmented. Liver fat may be decreased by prolonged starvation, by thyroid feeding, or by insulin administration. We are not likely to under-estimate the significance of insulin in this connexion, but in diabetic dogs with a constant and apparently adequate amount of insulin and in normal rats receiving a diet rich in carbohydrate, which stimulates the liberation of insulin, choline exerts rather dramatic effects on liver fat.

It is a pleasure to acknowledge my indebtedness to my colleagues, whose names appear in the text, for their most helpful interest in these lectures.

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A NEW TECHNIQUE FOR THE SELF-ADMINISTRATION OF GAS-AIR ANALGESIA IN LABOUR

By R. J. Minnitt, M.D. Liverp.

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Some analgesic for the sufferings of parturient women has been sought for a long time by those who sympathise with them. While gas-and-oxygen anæsthesia has been a satisfactory solution to the problem, the cost of the equipment and the necessary supervision by a medical man make it unavailable for the large majority of patients in labour. There appears, however, to be no question that the use of nitrous oxide should be developed. A method has therefore been evolved to combine this gas with a definite proportion of air, so that the constant mixture employed would produce analgesia without loss of consciousness.

The apparatus devised for this purpose was an adaptation of a McKesson oxygen therapy apparatus, and consists of a reduced pressure regulator, combined with a small rubber bag enclosed in a metal drum, so arranged that an automatic valve prevents the flow of gas when the patient does not inhale. The outlet of the machine is divided into two channels, one for the passage of gas and the other for air, admitted in a constant amount making a mixture of approximately 35 per cent. nitrous oxide in air. On the face-piece is fitted a spring finger release, which is pressed down during inhalation, but allows full air (thereby throwing the machine out of action) if the analgesia becomes deep enough to weaken the force used, or at the will of the patient. The expiratory valve is in the face-piece—non-adjustable, a spring allowing it to rise with expiration.

There are two models made, one in a carrying case as a portable model (Fig. 1) (overall size 12 in. × 8 in. × 18 in.; weight about 15 lb. without cylinders), and the other on an aluminium stand for hospital use (Fig. 2). The amount of gas consumed is on the average 35 to 40 gallons per hour; this depends on the frequency of pains and depth of breathing.

As the analgesia is self-administered the coöperation of the patient is essential. The important point is that at all times when inhaling the mixture from the machine the face-piece must fit in an air-tight manner.

Scientific work has been done in the Liverpool Maternity Hospital to show that there is no danger to mother or child by the use of the analgesia. Electrocardiograms were taken of a series of patients immediately before and at the end of the administration, and again a day or two later. Dr. Leslie Cunningham, Medical Officer in Charge of the Electrocardiograph Department of the David Lewis Northern Hospital, Liverpool, kindly reported upon these, and stated that they did not appear to be influenced to any significant extent as a result of the patients' experience. The alteration in the mother's pulse and the fœtal heart rates, estimated at approximately equal intervals during analgesia, were within normal limits.

A biochemical study was made of blood taken from a maternal vein and the umbilical cord in a number of patients immediately after delivery, with and without analgesia, and conclusions were drawn that although the administration of gas and air reduced the oxygen content of the mother's blood, that of the umbilical cord did not show any marked alteration.

As far as could be ascertained from observatio made on 81 primigravidæ and 47 multigravid making use of the analgesia for varying tim including delivery, the average length of the seco stage was within normal limits.

The apparatus has been in constant use, both the Liverpool Maternity Hospital and the Wellhou Hospital, Barnet, Herts, since the middle of Octob last, and over 300 cases have had the benefit of t analgesia. In the former of these hospitals the meth of the administration has been supervised by D Hilda Garry, under my direction, a grant having be given to the hospital by the National Birthday Tru Fund. In the latter Dr. John Elam, of Barne enthusiastically organised the inauguration of t new technique, under the supervision of Dr. H. Rolar Segar, the Medical Superintendent. Except in a fe cases which were found unsuited for this form analgesia, the relief from pain and distress w uniformly very good, both during the second sta and at the delivery. The failures, which did not com to more than 9 per cent. of all the cases observe were due to the following causes :

(1) Non-coöperation of the patient.

(2) Dislike of inhaling anything which migl produce unconsciousness, there being some difficult in persuading this type of patient that this would n happen.

(3) Hysterical conditions, which prevented th proper control of the method.

(4) A tardy administration, which meant tha education of the patient in the proper use of th apparatus was not possible before the birth of th child. The earlier the administration is commence the greater is the relief, as there is more time fo acquiring coöperation.

From my personal observation I feel that this ne

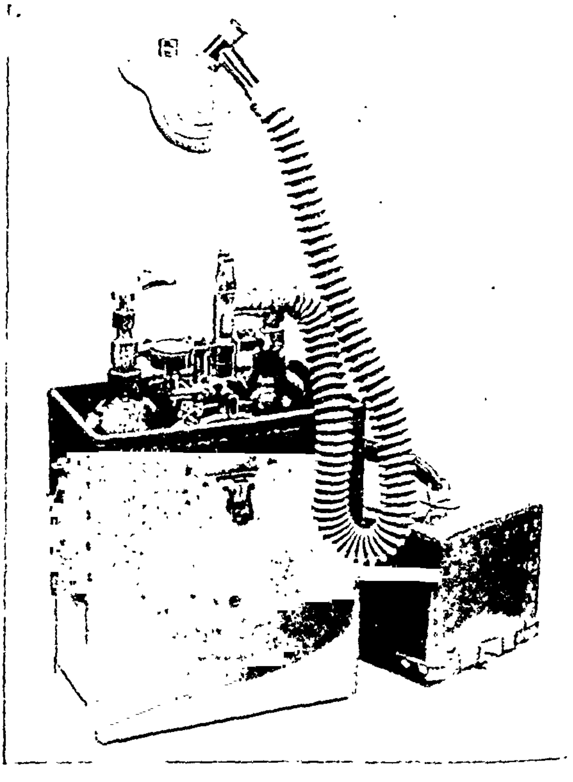

FIG. 1.—Portable model.

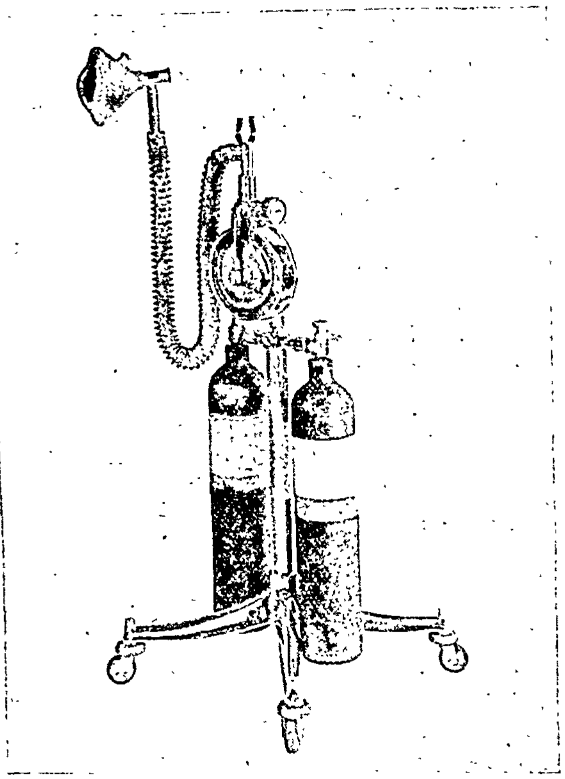

FIG. 2.—Hospital model.

technique has the following advantages. First, there is analgesia, which I define as insensibility to pain without loss of consciousness, so that the patient is able to understand and carry out any instructions given. Secondly, the apparatus is under her personal control, which permits the general practitioner or midwife to carry on the obstetric work without interference. Thirdly, the well-being of the patient both during labour and afterwards is conspicuous. It should be realised, however, that the apparatus was only designed for use in normal labour, and therefore is not applicable for such procedures as version, the application of forceps, or any extensive repair of the perineum. Anything of this kind carried out under analgesia, and not anæsthesia, might give rise to grave symptoms of shock.

As a general rule cyanosis should not appear during administration, although when the patient is holding her breath owing to bearing down slight blueness may be observed. As cyanosis is one of the signs of serious heart or lung disease, any depth of this should raise suspicion and the cause should be sought.

I can see no reason why an organised scheme should not be developed for the use of the method in domiciliary work (for patients attended by midwives) and I look forward to the day when the authorities will coöperate with the public in this enterprise.

Messrs. A. Charles King Ltd., London, are the manufacturers of the apparatus, which is known as the Minnitt gas-air analgesia apparatus.

UNIVERSITY OF LONDON.—It is announced that the Kent County Council have decided to make a grant of £40,000, payable over ten years, towards the cost of erecting new university buildings on the Bloomsbury site. The Worshipful Company of Butchers have also made a grant towards the ceremonial hall to be built on the site.

VITAMIN C IN THE HUMAN PITUITARY

By J. Gough, M.D. Wales

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AMONG the methods which have been devised for the detection of ascorbic acid (vitamin C) is the histochemical test of Szent-Györgyi.[1] This depends on the strong reducing properties of ascorbic acid, and when tissues rich in this substance are brought into contact with a dilute solution (0·4 per cent.) of silver nitrate for 15 minutes (in the dark) they become blackened from deposit of reduced silver. In animal tissues Szent-Györgyi found the strongest reaction to be obtained in the adrenal cortex, whilst in certain other tissues, such as brain, liver, and muscle, the reaction was practically negative, and he therefore concluded that the adrenal is specifically concerned with ascorbic acid. Later, Gough and Zilva [2] found that the anterior lobe of the pituitary in certain species—e.g., man, ox, and dog—yielded a stronger Szent-Györgyi reaction than the adrenal, and also that the corpus luteum in the dog was relatively strongly reacting. Further, they found by biological assay that the antiscorbutic potency of the anterior lobe of the ox pituitary was about twice as great as that of the adrenal. The pituitary, in the ox at least, appears to be the richest of the known vitamin-C containing tissues, and seems indeed to be as rich as any of the well-recognised natural sources of the substance, such as mango (Perry and Zilva [3]) and paprica (Svirbely and Szent-Györgyi [4]). Regarding the corpus luteum, Huszác [5] has shown by biological assay that this tissue in the pig contains as much vitamin C as the adrenal. Thus the three tissues which are already known to give a strong reaction with the silver nitrate test have been shown by other methods to be rich in the vitamin.

THE HUMAN PITUITARY

Applying the silver nitrate test to material from 42 hospital autopsies, Gough and Zilva found that the pituitary in man practically invariably stained darker than the adrenal, but they also noted that there was a considerable variation in the intensity of the reaction in different individuals. A series of 100 cases have now been examined, and the observation has been made that the intensity of the reaction in the pituitary runs roughly parallel with the state of nutrition of the body, as judged by the presence or absence of emaciation. On the whole a poor reaction occurs in persons who have suffered prolonged illness and are obviously emaciated, whilst a strong reaction is usually seen in those who appear to have suffered no appreciable disturbance of general body nutrition as a result of the fatal illness.

INTENSITY OF THE REACTION IN RELATION TO DISEASE

The Szent-Györgyi silver reaction was applied to 100 consecutive post-mortem cases of death from various diseases, and the cases were investigated and classified according to the intensity of the reaction into the following four groups—viz., strong, moderate, slight, and negative reactions.

Strong reaction (38 cases).—General nourishment of the body appeared approximately normal in 34. There was obvious wasting in only 4, and in none of them was this severe. The majority of the cases were of rapidly fatal illnesses. Of the 4 which showed wasting 3 were children 2–5 years of age dying of septic meningitis, pyonephrosis, and strangulation of the intestine respectively. The fourth was a woman of 36 years dying of cystitis one month after parturition. Of the remaining 34 cases—i.e., those in which nourishment was normal—17 were of illnesses lasting less than seven days, including 11 of acute infection (septicæmia, pneumonia, and meningitis), 2 of post-partum pulmonary embolism, 2 of obstructed labour, 1 of strangulated intestine, and 1 of ruptured basilar aneurysm. Seventeen cases were of longer illness; but of these 4 were ambulatory cases of papilloma of larynx, fibroid uterus, meningioma, and glioma respectively, in which death followed within 24 hours of surgical operation. These were virtually short illnesses. The remaining cases were: 3 of cerebral abscess, 2 of gummatous meningitis, 2 of leukæmia, and 1 each of tuberculous pericarditis, acute myelitis, aortic aneurysm, gastric ulcer, pseudohypertrophic muscular palsy, and carcinoma of the colon. In the last-mentioned case there was no apparent wasting and the first symptoms, due to acute intestinal obstruction, occurred ten days before death.

Thus although the cases giving a strong reaction were of a miscellaneous nature, they did not include a single case of long-standing disease with severe emaciation.

Moderate reaction (25 cases).—General nourishment of the body appeared normal in 16. There was moderate wasting in 8 and severe emaciation in 1 (tabes dorsalis) case. The cases of moderate wasting were: 2 of carcinoma of stomach, 1 of carcinoma of bladder, 1 of carcinoma of adrenals, 2 of leukæmia, 1 of miliary tuberculosis, and 1 of pericarditis. Those of normal nourishment were 9 of acute infection (septicæmia, meningitis, pneumonia), 4 of chronic cystitis, and 1 each of cholecystitis, pericarditis, and cerebral softening. It is to be noted that the cases of carcinoma of stomach showed little wasting, and both died within a few days of surgical removal of the tumour.

Slight reaction (26 cases).—Thirteen showed severe wasting, 9 showed moderate wasting, and only 4 appeared of normal nourishment. The cases of normal nourishment were cerebral softening, strangulated hernia, papilloma of bladder, and infantile convulsions. The cases of moderate emaciation were carcinoma of lung, glioma, empyema, chronic nephritis, congenital hydrocephalus, 2 of cystitis, and 2 of pernicious anæmia. The cases of extreme emaciation were carcinoma of lung, œsophagus, and pancreas respectively, malignant melanoma, sarcoma of jaw, Hodgkin's disease, obstructive jaundice, hyperemesis gravidarum, stenosis of œsophagus, 2 cases of gastric ulcer, and 1 of abscess of lung.

Nearly all the cases giving a slight reaction were thus of long-standing disease, and most of them showed emaciation.

Negative reaction (11 cases).—Eight showed severe emaciation and 2 moderate emaciation. In only 1 case was the general nourishment normal. All the cases were of illness longer than three months' duration. The case in which nourishment was normal was of carcinoma of the colon in a man of 75. The cases of moderate emaciation were syphilitic pneumonia and carcinoma of the tongue. The cases of extreme emaciation were 2 carcinoma of the stomach, 1 of œsophagus, 1 of lung, Hodgkin's disease, tuberculous peritonitis, pyelonephritis, and chronic ethmoiditis with meningitis.

In the 100 cases generally it will be seen that those in the first two groups are largely made up of deaths from short illnesses, while those which gave slight and negative reactions, on the other hand, are made up mainly of deaths from long-standing wasting diseases.

In order to ascertain as far as possible the state of the pituitary in the healthy individual, 7 cases of persons dying of rapidly fatal injury have been examined. Five of these gave a strong reaction (ages 16, 20, 21, 33, and 35 years), and two gave a moderate reaction (ages 63 and 67 years). The first-mentioned degree may thus be tentatively accepted as usual in younger persons, and the moderate degree in those over 60, and throughout the whole series it was noted that the reaction tended to be stronger in the young and middle-aged than in the aged. Strong reactions have been found in individuals of ages ranging from a few months to 60 years. It is interesting to note, however, that in the newly born the reaction was only of moderate intensity. (During the
course of this investigation four cases of neona
death were examined. These are not included in t
cases dealt with above.) There was no obvi
seasonal variation in the intensity of the reaction, a
strong reactions were obtained as frequently in t
winter as in the summer months. In this connexi
however, it may be pointed out that the temperat
at which the reaction is carried out must be st
dardised, as it has been found that at low temperat
the reaction is retarded. In the present work t
tests were carried out at normal room temperatu
The time at which the autopsy was carried out af
death did not appear materially to affect the intens
of the reaction, provided that it was not greater th
60 hours. All the bodies used in this investigat
had, however, been kept in a refrigerator.

DISCUSSION

In guinea-pigs, withholding of vitamin C from t
diet depletes the content normally present in t
adrenal (Svirbely [6]; Svirbely and Szent-Györgyi
and causes a diminution of the silver reaction (Mo
and Ray [7]; Siehrs and Miller [8]). That the failure
the human pituitary to give the reaction in cert
cases is due to a diminished content of the vitan
would seem to be a natural conclusion. Harris a
Ray,[9] however, have cast doubt on the reliability
a negative silver reaction as an index of the abse
of vitamin C. They base their views chiefly on t
fact that in the ox the adrenal medulla, which conta
a large amount of vitamin C, fails to give the reacti
They, and Huszác,[10] have suggested that in t
tissue there is a substance which inhibits the sil
reaction, and Huszác has shown that if the tissue
first treated with lead acetate the reaction can
satisfactorily obtained. I have ascertained that
negative reactions in the human pituitary are not d
to the same reason, for they remain negative e
after the application of Huszác's modified test. Y
since it has not been found possible to carry
biological assay on the human material, it see
unjustifiable to conclude definitely that the negat
reactions in the human pituitary are due to abse
of the vitamin. It is significant, however, that
healthy people dying as a result of accident or
those dying of acute disease the reactions were stron
positive, while in those dying of long-standing wast
diseases, especially when diet had been grea
restricted, the reactions were slight or negative. T
although the reaction was comparatively weak
most cases of malignant tumour, it was weakest
those cases of carcinoma of the alimentary ca
where emaciation was most severe. Again,
pituitaries from two cases of gastric ulcer where d
had been restricted showed only a slight reacti
while in another where diet had been normal a
death due to sudden hæmorrhage there was a stron
positive reaction. Perhaps the most significant c
was that of a child aged five months which had b
fed wholly on condensed milk. It developed sev
rickets and died of convulsions. It did not show a
signs of scurvy, but the Szent-Györgyi test
vitamin C gave only a feeble reaction in contrast to
intense one which was found in breast-fed infa
dying at that age. It thus seems possible to conn
the weak reactions with disturbance of food inta
Whether associated emaciation *per se* has a
influence, it has not been possible to determine.

In conclusion it may be stated that Vogt [11] h
found great diminution in the vitamin-A content
the pituitary in precisely those conditions which g
a poor silver reaction for vitamin C—namely, chro
wasting diseases.

SUMMARY

The Szent-Györgyi test for ascorbic acid (vitamin C) when applied to 100 human pituitaries obtained at autopsies showed: (1) that the reaction in the anterior lobe was intense in young and middle-aged individuals in whom general body nourishment appeared normal; (2) that the reaction was slight or negative in individuals who had died of long-standing disease with severe emaciation; (3) that the reaction was less intense in the aged than in younger subjects.

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HYDATID DISEASE OF THE LUNG

WITH A CASE REPORT

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ALTHOUGH hydatid disease is not rare in this country—contrary to the views often expressed by both physicians and surgeons—it may fairly be described as regional. For the past three years there have been admitted to the General Hospital, on an average, three cases each year from the Swansea district. These cases were mostly hepatic cysts. Human infection is usually due to eating unboiled vegetables soiled by the excreta of dogs or contaminated by flies (watercress is noted to be a frequent agent in the Swansea area). The swallowed ova develop into embryos which penetrate the wall of the bowel and are carried in the portal vein to the liver and thence to other parts of the body.

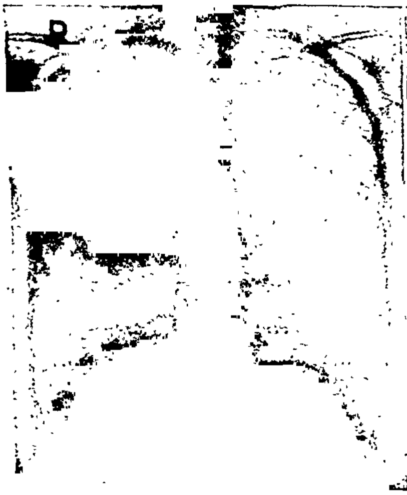


FIG. 1.—Radiogram taken three months after initial clinical examination.

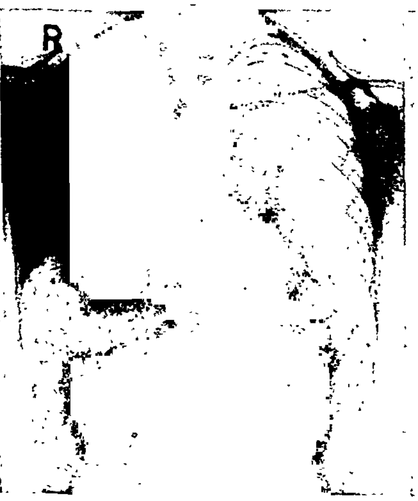


FIG. 2.—Showing increase in size of lesion in the right lung, with cardiac and tracheal displacement to the left. The left lung is clear.

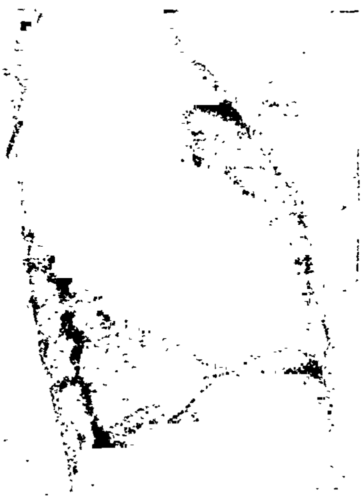


FIG. 3.—Lateral view, taken on the same date as Fig. 2. This localises the lesion mainly in the anterior part of the lung.

The commonest site for the disease is in the liver, the next frequent location is in the lung, in the ratio of about 10 : 1. Primary hydatid disease of the lung must be considered a rare form.

Klose[1] records only 4 cases of the primary form in a series of 62. In Megarth's[1] series of 93 children, only two showed the pulmonary site as early as 10 years. The secondary form of hydatid disease in the lungs may be due to rupture of a liver cyst or to metastases via the venous circulation or lymphatics.

Ortenberg[2] considers that when the disease metastasises by the blood stream the pulmonary lesion is always multiple and bilateral, the cysts are small and uniform in size, and are usually situated in the peripheral and subpleural portions of the lungs. The primary form may ante-date diagnosis for as long as six or even ten years. Ortenberg reports a case of rupture of a pulmonary hydatid cyst—probably of secondary origin—in a girl aged 12 years, with spontaneous recovery. Microscopic examination of the vomica in this case showed no hooklets; pus, elastic fibres, and alveolar cells were present. Puncture of the pleura was unproductive.

Green[3] describes a case in a child aged 11 years. The cyst ruptured into a bronchus, and microscopic examination of the vomica showed a laminated cyst wall and two scolices complete with hooklets. A blood count revealed a leucocytosis but no eosinophilia.

In 1908 Morquio[4] published in the *Archives de Médecine des Enfants* a memoir based on 12 cases. Since that time he has treated more than 100 cases. He mentions that the disease was more frequent in boys than in girls, and that the age of predilection is between 8 and 12 years. No cases were observed before the age of 4 years.

Hæmoptysis is said to occur in 60 per cent. of the cases of hydatid cysts of pulmonary origin. It may be the only clinical manifestation and varies in quantity and degree, although it is seldom very grave. A useful clinical classification is suggested by Morquio,[4] who groups his cases thus:—

(1) *Silent or latent.*—In this group there are no clinical manifestations, and the condition is discovered during routine radiographic examination—the appearances of which are characteristic.

(2) *Cases with physical signs and little or no functional disturbance.*—Repeated attacks of bronchitis are not without significance in this type. Occasionally a slight hæmoptysis occurs and physical signs may or may not be marked. A diagnosis of pulmonary tuberculosis or pleurisy is often made.

(3) *Cases with physical signs and symptoms.*—The

symptoms predominate in this group. They may be lassitude, dyspnœa on the least exertion, cough and expectoration, and sweats which are sometimes severe and persistent. The physical signs may or may not be marked.

(4) *Complicated cases.*—The pulmonary complications which may accompany the cyst are congestion, a peri-pneumonitis, lobar and broncho-pneumonia.

(5) *Cases in which the cyst ruptures into a bronchus.*—In Morquio's series of cases 50 of this variety are described.

The case to be reported here showed relatively few initial symptoms, but the physical signs were marked throughout.

DIAGNOSIS OF THE CONDITION

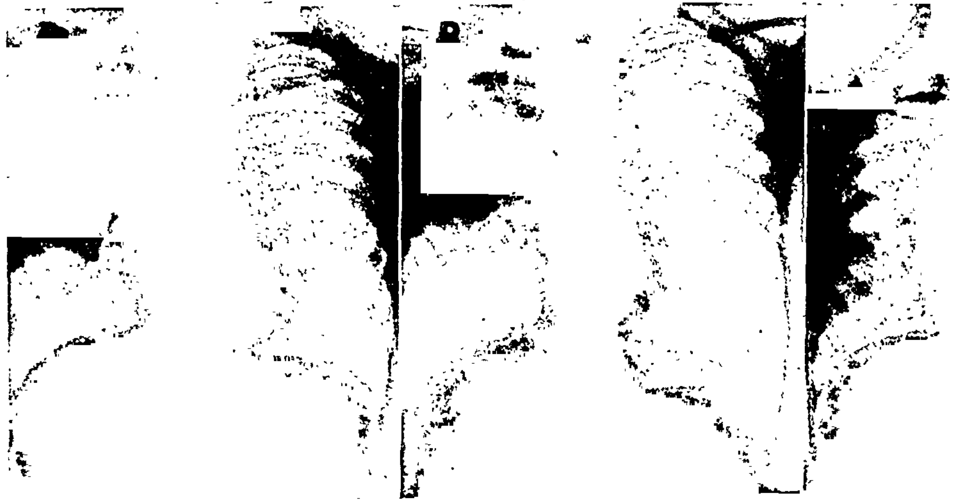
The diagnosis is clearly established after spontaneous rupture by finding hooklets, scolices, or portions of the cyst wall. Otherwise it may be fairly well confirmed by a correlation of the radioscopic appearances with the history, clinical and laboratory findings. If possible the sputum, vomit, urine, and excreta should be examined for hydatid membranes. The complement-fixation test of Axhausen, the precipitin-reaction test, and the Casoni intradermal test have been found reliable in a great proportion of cases, but it must be remembered that negative results do not negative the diagnosis and the presence of other tæniæ will vitiate the validity of the reactions. The blood count, too, typically showing an eosinophilia in hydatid disease, greatly assists in confirming the diagnosis, but again its absence does not negative it.

From the point of view of diagnosis the case reported here presented many difficulties. Owing to the initial diffidence of the patient's mother we were unable to carry out as many of the special investigations as we desired. The first clinical examination suggested a differential diagnosis between three conditions: (1) benign growth (cyst); (2) encysted effusion; and (3) pulmonary tuberculosis. The fact that the Pirquet cutaneous test was negative on two occasions was of no real significance in excluding tubercle as the cause; but with such marked physical signs as those present and the absence of any evidence of toxæmia, which one would expect to accompany these signs in a tuberculous process, this diagnosis was improbable. Exploratory needling of the chest might have cleared up the difficulty of diagnosis, but this is a case in point where this practice should be withheld *at least* until a radiographic examination has been made. In our case, especially, it was hardly justifiable in view of the graver possibilities which had to be borne in mind.

The initial radiographic examination (Jan. 28th, 1932) showed a definite lesion occupying the greater part of the right hemithorax (Fig. 1). There are various interesting features to be noted: (*a*) the increase in size of the right hemithorax, which may partly account for the lack of displacement of the thoracic viscera; (*b*) the defined lower and internal border; (*c*) the gradual shading into general haziness of the upper and outer border; and (*d*) the pronounced peak *of the diaphragm on the right side*. The condition was now considered to be non-tuberculous, and in spite of obvious difficulties a tentative diagnosis of pulmonary hydatid cyst was made on the radiographic appearances.

At first there was a complete denial of the child having associated with a dog at any period of her life, but later we were able to obtain a history that four years previously she had a wire-haired fox terrier which was bought from a stables. The dog had been ailing for two months and eventually was drowned. The child made a playmate of the dog and fondled it a great deal.

The next radiograms (April 25th, 1932) showed some bulging of the upper part of the right hemithorax. The trachea and heart were slightly displaced to the left. The lesion showed an increase in size downwards towards the diaphragm (Figs. 2 and 3). The two following radiograms—extending over a period of 12 months—showed what appeared to be improvement from a radiological standpoint. The lesion had contracted and now occupied the upper half of the right lung field. There was no cardiac displacement. The final radiogram (Fig. 6), taken on March 5th, 1934, showed evidence of fibrosis in the upper and inner part of the right lung. The trachea and heart are drawn over to the right. In the lower part of the lung field there are appearances suggesting peripneumonitis. Stereoscopic radiography suggested evidence of a localised atelectasis in the upper, inner, and anterior part of the right lung.



FIGS. 4 and 5.—Radiograms (taken at an interval of three months) showing contraction of the lesion in the right lung. There is evidence of fibrosis, and the mediastinum is slightly drawn over to the right.

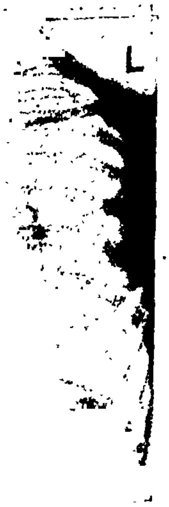


FIG. 6.—Radiographic appearance after spontaneous rupture of the cyst.

CASE RECORD

The patient was a schoolgirl, aged 8 years, and the only child. She was first seen at her home in October, 1931, at the request of the medical attendant, who suspected her of having pulmonary tuberculosis. Both her parents are alive and healthy, and there is no tuberculosis in the family. Her only previous illness was whooping-cough, from which she made a good recovery.

Present illness.—She was last quite well at the beginning of March, 1931. The first symptoms noticed were lassitude, listlessness, anorexia, and night sweats. At that period she was home from school for two weeks. She then remained fairly well until October of that year when she developed a somewhat similar attack, lassitude, anorexia, and night sweats being the predominant symptoms. There was a slight cough and scanty expectoration and ? loss of weight. She was kept in bed for three weeks. No record of the temperature was available, and no cause could be assigned to the symptoms.

Examination (Oct. 8th, 1931) at home. The general nutrition was good. The skin was normal in colour, but the mucous membranes showed some slight degree of anæmia. There were no scars or rashes present, no œdema, no incurving or ridging of the nails, and no clubbing of the fingers. No evidence of dyspnœa or cyanosis was noted, and the pulse-respiration ratio was normal. Throughout our entire observation of the case we were unable to get a specimen of sputum for examination, although this was said to be present but scanty.

The chest was well covered. There appeared to be some fullness over the whole of the right side, where movement and expansion were definitely restricted. The veins showed some prominence over the upper part of the chest wall, especially on the right side. No definite displacement of the cardiac impulse was noted. Palpation confirmed inspection. There was no rhonchal or friction fremitus present and no cardiac displacement. The percussion note was dull over the right upper lobe with some slight resistance. The area of cardiac dullness was not increased. Breath sounds were absent over the right upper lobe. Nothing abnormal was detected elsewhere in the body.

A Pirquet tuberculin test was done and this gave no reaction. It was repeated subsequently on April 28th, 1932, again with a negative result. The child was excluded from school and seen at frequent intervals up to last April.

Résumé of clinical notes.—Oct. 12th, 1931: physical signs more marked in right lung; dullness increased; coarse crepitations in right paravertebral area. April 25th, 1932: patient complained of dyspnœa on least exertion; heart slightly over to the left, otherwise no marked change in physical signs; note increase in size of lesion on radiogram (Fig. 2). July 28th, 1932: gaining weight; previous day patient had a hæmoptysis accompanied by much purulent expectoration; no systemic disturbance noted. Oct. 27th, 1932: intense bronchial breath sounds over right upper zone; pleural friction in basal region; no cardiac displacement; contraction of lesion in radiogram—apparently after partial evacuation of cyst on July 28th. Sept. 18th, 1933: still gaining weight; no marked change noted in physical signs in intervening period.

On Nov. 25th, 1933, the patient was admitted to hospital because a week previously she had been taken ill with repeated bouts of coughing. Temperature 102° F. During this time, on three occasions, she coughed up "pieces of skin," accompanied by much foul sputum. With these attacks she became very dyspnœic. She was admitted to hospital as an emergency case, and on the following morning she developed another bout of coughing and expectorated some material which was later identified as the wall of a hydatid cyst. Pus cells and bacteria were present, but no hooklets were found. During the next few days she became gravely ill, presenting symptoms of marked cardiac and respiratory embarrassment and developing an urticarial rash. Symptomatic treatment was adopted and the temperature settled to within normal limits on the sixth day after admission. Thence she made an uninterrupted recovery and was discharged on Dec. 14th, 1933.

Special investigations.—A differential white cell blood count showed percentages which were within normal limits. There was *no* eosinophilia. A Casoni intradermal test with two antigens was negative.

Recent history.—March 5th, 1934: continued gain in weight. Slight dry cough. General condition good. Slight restriction of expansion with impaired resonance over the right upper zone. Bronchial breath sounds in infraclavicular region. Pleural friction in mid-zone. Marked whispering pectoriloquy along upper dorsal spine. March 19th: no symptoms. Pleural friction disappeared, otherwise physical signs in statu quo. April 5th: patient fit and well—attending school. No symptoms. Physical signs in statu quo.

CONCLUSION

Despite the advances made in thoracic surgery during recent years, the removal of pulmonary cysts must still be fraught with grave risks and the operative mortality in children is high (15 per cent.). Spontaneous rupture is not free from danger either; immediate death from suffocation may occur or death may result from an acute intoxication of an anaphylactic nature. With reservations, the dictum of Trousseau must still be accepted—viz., "Generally speaking, the wisest course is to refrain from interference and be a watchful observer of nature's methods."

I should like to record my thanks to Dr. H. M. Williams, tuberculosis physician for Swansea, for his permission to publish this case; to Dr. W. Macdonald, hon. physician to the Swansea General Hospital, for permission to follow up the case while under his care in hospital; and to Dr. A. F. Sladden, pathologist to the hospital, for his reports on the laboratory findings.

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Clinical and Laboratory Notes

EMPYEMA NECESSITATIS ASSOCIATED WITH PARAPLEGIA

By C. Allan Birch, M.D. Liverp., M.R.C.P. Lond.

LATE SENIOR MEDICAL REGISTRAR, ROYAL INFIRMARY, LIVERPOOL; DOROTHY TEMPLE CROSS TRAVELLING FELLOW

Many cases have been reported in which an empyema has ruptured spontaneously and the pus has pointed in unusual situations. The following case is recorded because of the possibility of direct causal relationship between thoracic empyema and true suppurative myelitis. Opportunities for detailed investigation before and after death were limited, but the known facts make an interesting story.

A. B., an unmarried girl aged 18, had no previous illnesses beyond scarlatina as a child and tonsillectomy at 13. She became ill with pain in the back and shivering and was thought to have influenza. Three days later her legs became weak, and on the fourth day she had a complete flaccid paraplegia with anæsthesia to cotton-wool touch and pin-prick, extending up to the middle of the thighs. She was incontinent of urine and fæces. She had no cough or sputum throughout her illness, and no dyspnœa, cyanosis, or chest pain.

The temperature was intermittent (102–104° F.) from the onset of the illness. She had no rigors. A certain amount of deep sensation returned in the legs, but anæsthesia to pin-prick extended as high as the middle of the sternum.

A few investigations were made early in the illness. A blood count showed 26,186 leucocytes per c.mm., of which 86 per cent. were polymorphs. Radiography of the spine (with a small portable machine) showed no apparent change. The Wassermann reaction was negative. She had a slight vaginal discharge, but no gonococci were present in it. At this time the urine was normal, but later she developed an acute cystitis. Physical examination was otherwise negative. A diagnosis of transverse myelitis of unknown ætiology was made. During the first four days of her illness three observers found no signs of disease in the lungs. When next seen by me two weeks later she was moribund and was not examined.

At autopsy the right pleural cavity contained about three pints of foul pus. The base of the right lung showed a small patch of consolidation and much fibrinous pleurisy. There was a patch of consolidation in the apex of the left lower lobe. The erectores spinæ were infiltrated with pus and there was a large abscess outside the vertebræ which communicated with a diffuse trough of pus in the spinal canal and in which the spinal cord could hardly be distinguished. Above the level of the seventh cervical vertebra the spinal cord was normal and the brain was normal. No localised disease of the vertebræ could be found.

There are three possibilities to be considered in this case: (1) that the initial lesion was a myelitis of unknown nature which was later complicated by a pneumonia and an empyema which invaded the spinal canal; (2) that the initial lesion was in the right chest and the paraplegia resulted from it by direct extension of pus; (3) that the lung and cord lesions arose simultaneously as part of a septicæmia.

The fact that the patient had no symptoms or signs referable to the chest at the onset is a point, admittedly not a strong one, in favour of a primary myelitis. The high initial temperature and the condition found at autopsy are in favour of an initial lesion in the lung. Blood cultures were not made. Whatever be the true order of events in this case the fact that an empyema may track into the spinal canal is shown.

A CASE OF MULTIPLE ANEURYSMS

By A. G. Sanders, M.B. Lond.

LATE SENIOR HOUSE PHYSICIAN, THE METROPOLITAN HOSPITAL, LONDON

The following case of multiple syphilitic aneurysms is sufficiently unusual to be recorded.

The patient, a Jewish woman aged 63 years, was admitted to the Metropolitan Hospital under the care of Dr. C. Worster-Drought in March, 1933, for cough and shortness of breath.

Family history.—Her husband is under treatment for neurosyphilis of the meningo-vascular type. He is now aged 61 years and was first seen in March, 1925, with a history that in February, 1924, he had a "stroke," remaining more or less unconscious for 14 days. He gave a history of specific disease 30 years before which was inadequately treated. On examination he showed right pupil greater than left, both reacting sluggishly to light and normally to accommodation; slight weakness of lower half of the left side of face; spastic condition of both left arm and left leg, left arm showing limited movement at shoulder and elbow but none at wrist and fingers. Left leg showed limited movement at all joints. All left arm-jerks greater than right; knee- and ankle-jerks brisk, left greater than right; left plantar extensor, right flexor; left abdominal reflexes absent. Gait that of spastic left-sided hemiplegia. Heart not enlarged, sounds normal, pulse 84, regular. Blood-vessels somewhat thickened. Blood pressure 140/83. Blood Wassermann reaction strongly positive. Cerebro-spinal fluid: 10 cells per c.mm., small lymphocytes with an occasional plasma cell; protein 0·045 per cent.; globulin faint trace; Wassermann reaction positive; Lange curve 122332100.

He was treated with periodical courses of Novarsenobillon and bismuth injections as well as iodides by the mouth and improved considerably. The movements in the left hand and at the left wrist returned; at the present time the arm shows only slight spasticity and he uses it well. Similarly, the left leg shows good movement and is only slightly spastic. The last cerebro-spinal fluid examination carried out in November, 1930, showed only 5 small lymphocytes per c.mm., total protein 0·03 per cent., globulin and Wassermann reactions negative, and Lange reaction 2221100000. Blood Wassermann reaction weakly positive. He remains well and is able to carry on his work as a small shop-keeper.

The only child is a daughter aged 49 years who shows no signs of syphilis and has two healthy children.

Previous history.—The patient had one miscarriage six years after her daughter was born—i.e., 36 years ago. She has never had any rashes or other secondary manifestations. Myomectomy 22 years ago.

History of present illness.—For one year the patient has not been able to bend down nor bend her head far forward as these movements brought on a "choking feeling" in the upper part of the chest. For about six months she has only been able to sip fluids as a large draught also brought on the same feeling. For three months she has become progressively short of breath, especially on exertion, while for two months she has had a harsh cough which increased the dyspnœa and also caused occasional cyanosis. She could not lie down without distress.

Present condition.—She has an occasional brassy cough with voice husky. On the right side of the neck a pulsating swelling can be seen, about the size of half an orange, and a smaller swelling on the left side. On palpation the first is found to be an aneurysm, presumably of the right common carotid artery involving its bifurcation, while the second is the left common carotid dilated to about ¾ in. diameter. The left subclavian artery is dilated and tortuous. There is a fusiform enlargement of the brachial artery at the bend of the right elbow, while the left brachial artery appears to be larger and more readily palpable than normally. No other aneurysms are found in the limbs. There is no "tracheal tug." The heart is dilated and the apex-beat felt in the fifth left interspace 3 in. from the sternal edge. The cardiac dullness extends upwards to the second space on the left side and ½ in. to the right side of the sternum in the second and third spaces. Auscultation reveals a soft, localised, systolic murmur at the apex. The aortic second sound is much accentuated, but there are no murmurs at the base of the heart nor can any be heard over the aneurysms in the neck and elsewhere. The pulses appear equal. B.P.: left 220/120; right 210/134. The lungs show mild general bronchitis. Abdomen normal. The pupils are irregular and inactive to light but react to accommodation. The tendon reflexes are all present but the knee-jerks are sluggish. Plantar responses flexor. The vocal cords and larynx are normal. The blood gives a "two-plus" Wassermann reaction and a positive Sigma test of 1·9 units.

The cerebro-spinal fluid is normal in all respects with negative W.R. The urine shows no abnormality. An X ray examination of the chest shows the following: "*Heart:* general enlargement. *Aorta:* arch is enlarged and displaced upwards and to the left. Descending aorta is also enlarged. Plaques seen in walls of arch. Diagnosis: aortitis ? atheromatous."

With several weeks rest in bed the patient improved sufficiently to return home where she has since been fairly well.

I am indebted to Dr. C. Worster-Drought for kindly allowing me to record this case and also for the notes of the husband's condition.

MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

SECTIONS OF OTOLOGY AND LARYNGOLOGY

THE summer meetings of these sections took place at the University of Birmingham on June 8th and 9th.

The President of the section of otology, Mr. W. J. HARRISON, was in the chair at the first session when Sir CHARLES BALLANCE read a paper on

Nerve Anastomosis

illustrated by slides and cinematograph films. He said that the earliest experiments on the suture of nerves were those of Fleurens, and that since 1895 surgeons had been uniting the peripheral end of a divided nerve to the central end of some other divided nerve of the neck. The recovery of the muscles of the face after such an operation, though often remarkably satisfactory in comparison with the preceding paralysis, was at no time functionally perfect. At the conclusion of the war he determined to try to ascertain, by the experimental method, the best procedure in operating for facial palsy. With this object, thirty experiments were carried out, in which the facial nerve was united to various nerves in the neck. At the end of six months the voluntary movement and the faradic response were normal in several of the animals, and the muscles on both sides of the face contracted together. But when the facial nerve was grafted to the hypoglossal, the descending hypoglossi, or the glosso-pharyngeal nerve, associated movements, varying from slight closure of the eyelids to contractions involving other muscles of the face and pinna, were present. Four years ago Dr. Arthur Duel, of New York, invited Sir Charles to join him in conducting surgical research and there they took up the question of the operative treatment of facial palsy. The decision to employ a nerve graft in the Fallopian canal was evolved after nearly a year of experimentation, the animals used being monkeys. There was, he said, no such thing as anastomosis of nerves. The distal segment of the nerve degenerated, and at the end of fourteen days it could be described as a bundle of tubes containing the broken-down fatty elements of the nerve sheath. The decision to perform an intertemporal operation for the cure of facial palsy was strengthened by the recognition that an injured nerve should be exposed at the site of the injury. In man, the complete or radical mastoid operation should be done before the outer wall of the aqueduct was removed. Decompression was the obvious course to adopt. In many cases it was best to expose the nerve from the geniculate ganglion to the stylomastoid foramen. A long graft was needed to fill up the gap. Neither the speaker nor Dr. Duel favoured an operation which aimed at shortening the course of the nerve by displacing it from the canal.

Expression of the emotions was, he continued, the best test in assessing whether the operation had been followed by the harmonious working of the two sides of the face. Dr. Duel was responsible for the use of degenerated grafts instead of fresh grafts, and he demonstrated their surgical value. The degenerated grafts consisted of a series of tubes filled with fatty masses due to the breaking up of the sheaths; through these tunnels the axis cylinders slid along with great facility. The use of this graft might determine the return of faradic excitability in the muscles of the palsied face in as short a period as a month. In 13 of the first series of 22 experiments on baboons, spontaneous contractions of the face muscles were observed, and in 8 of the 13 the facial nerve had been grafted to another nerve of the neck; in the remaining 5 the nerve graft operation had been done. Anæsthesia was noted to cut out the control of the neopallium. If the cerebrum was removed by section of the crura cerebri, the spasms of the facial muscles became still more exaggerated; the monkey continued to breathe, and lived on its brain stem. Neither Dr. Duel nor Sir Charles had observed, after operations on patients for facial paralysis, any spasm of the muscles, showing that in this respect the monkey differed from man.

Sir HAROLD GILLIES related his

Experiences with Fascia Lata Grafts

He said that the value of the support given by the fascia lata was comparable to that of the cock-up splint. It was essentially a palliative operation, but its use had been established, and in cases promising to recover it was a great aid in promoting recovery. There were two main methods of taking the graft: the open and the closed. In the first, a long incision was made down the thigh; in the second, a nick was made and a ring cutter inserted and a portion of graft removed. The usual positions for placing these strips of fascia lata were the centre of the lower lip, centre of upper lip, and the angle of the mouth. For paralysed eyelids he considered that the use of a temporal muscle slip *plus* its own temporal muscle fascia was best. Despite every care in asepsis, mild infection occurred in quite a considerable proportion of the cases; that was especially so if the graft perforated the mucous membrane. Sir Harold favoured the closed method, and by means of a cinematograph film he demonstrated the operation.

The subject was discussed by the PRESIDENT, Mr. LIONEL COLLEDGE, Mr. E. WATSON-WILLIAMS, Mr. HAMBLEN THOMAS, Mr. SYDNEY SCOTT, Mr. THACKER NEVILLE, Dr. DOUGLAS GUTHRIE, and Mr. HOLT DIGGLE.

Phonation and Articulation

Mr. STEPHEN JONES read a paper on Normal Phonation and Articulation, illustrated by diagrams, and Mr. V. E. NEGUS contributed one on Disorders of Phonation. He showed that it was necessary that the margins of the glottis should be even, otherwise a complete shutting off of the air current would not occur. Growths or ulcerations at the margins produced superimposed tones or noise. In the raising of pitch the contraction of the thyro-arytenoid muscle was increased; it was these muscles which imparted elasticity to the margins of the glottis. A high-pitch note was always more difficult to sustain than a low one. He maintained that the vocal cord was unnecessary for phonation. The use of the other muscles was to hold the scaffolding of the larynx in correct position during phonation. Laryngitis or laryngeal ulceration was responsible for extra puffs of air, with a resultant harsh quality of voice. He illustrated the comparative anatomy of the organs of phonation by a series of slides.

Miss FREDA PARSONS, who is in charge of the Phonetics Clinic at Queen's Hospital, and is concerned with re-education of the organs of speech and the mouth after operations, described her methods. Her main object was to instil into the patient a conception of the high function of speech, and to use every device to cause him or her—and most of her pupils were children—to feel a real joy in learning to talk distinctly. This was especially necessary, as people who were dumb and had serious speech defects were very depressed. If speech was impossible or difficult the personality became imprisoned, and, since speech was the chief means of social intercourse, failure of this function inevitably induced a feeling of inferiority. She taught her subjects to increase the flexibility of their speech organs, and the value of voiceless stops and voiceless continuance. If the tones were adequately taught, she found that the vowels fell into shape normally. For that reason she devoted special attention to the consonants. Every few days she devised some new means of sustaining the patients' interest and excitement. Miss Parsons demonstrated, in a number of children and one woman aged 56, the means by which she re-educated the speech capacity; in all the articulation was such as to form a model for some normal people. Before the exercises the woman, who had had a two-stage operation on the mouth, was unable to use the telephone; she did not fail in any of the requirements of her life.

Mr. BRAYSHAW GILHESPY remarked that the pitch of consonants was mainly in the region of 8192 double vibrations per second, or tuning fork C_6, and that the vowel sounds were situated lower in the scale—namely, between 400 and 2000 double vibrations per second. If the hearing below 2000 double vibrations was lost, there resulted great confusion in distinguishing certain vowels, apart from difficulty in hearing them, as certain pairs of the vowels had fundamental notes so close together that differences in frequencies could not be appreciated unless one of the pair possessed an overtone by which it could be recognised. People with nerve deafness failed in reference to their consonants. In conclusion, he remarked how little was taught of phonetics in standard text-books on ear and throat work.

Dr. T. C. GRAVES (Birmingham) read a communication, supported by two cases, on

Sphenoidal Sinus Infection in Relation to Mental Disorder

He showed that when mania arose from the existence of closed foci of sepsis the ordinary sedative drugs failed to remove the excitement. Both the patients had serious circulatory disturbance, which rendered the subjects unfavourable risks. The first patient, a woman aged 25, was certified, for the first time, in April, 1933, and was discharged in the following November, since when her recovery had been maintained. She had had nasal catarrh, and, later, cacosmia and cacogeusia; also headaches and soreness in the right temporo-parietal region, and the frontal at times. There was a history of two nervous breakdowns. She lost weight, developed faulty habits, was violent, and had severe general asthenia. Pus was found in the right sphenoid and left antrum, and was drained. Both ethmoids were hæmorrhagic. Septic tonsils were removed, and injections of colloidal sulphur were given. Improvement followed these measures, and she began to get well.

The other case was that of a woman aged 41, who was admitted to the mental hospital in August, 1929, and was not discharged until April, 1934. There was a history of familial chronic nasal and conjunctival sepsis, and she had frequent severe headaches and influenza. There were five normal pregnancies, and during the sixth she had an enlarged thyroid, and tremulousness, with cyanosis and vertigo. Periods of confusion and anger alternated with sleepiness. On admission she was grossly obese, and her tonsils were septic; also she had purulent conjunctivitis and blepharitis. Blood Wassermann was negative. There was evidence of sinus and tonsillar disease. Her menstrual function was profuse. Her mental state seemed to be secondary dementia with hallucinations and excitement. Examination showed infection of both sphenoids, yielding *B. influenzæ*, and the sinuses were drained intranasally. Following this there was mental improvement, and sedative drugs were no longer needed.

Mr. HAROLD ROUND demonstrated in a number of patients a remarkable dexterity and ingenuity in rectifying severe facial deformity following operation, and after removal of long-standing facial lupus.

NORTH OF ENGLAND OBSTETRICAL AND GYNÆCOLOGICAL SOCIETY

A MEETING of this society was held at Leeds on May, 11th, with Prof. DANIEL DOUGAL (Manchester), the president, in the chair.

Puerperal Fever and Peritonitis

Mr. D. W. CURRIE read a report on a hospital epidemic of puerperal fever which lasted from the end of February to the middle of March, and was due to a hæmolytic streptococcus. Ten women were affected and four died. In comment on his investigation, Mr. Currie pointed out that the hospital had been over-full for several days, the average daily in-patients being about 120 for 108 beds. The number of patients in the labour department varied from 9 to 15 for 10 beds.

> Three patients were in the labour department over three days, and were frequently moved from the first-stage ward to the labour ward and back; although the linen was changed at each move, it is possible that a septic patient soiled more than one bed. This danger is obviously liable to occur in a large central labour ward such as the one involved, which has six beds.
>
> One definitely septic patient was moved after delivery to a clean lying-in ward. She should have been sent to the isolation block, or at any rate to a side ward.
>
> There was often delay in transferring feverish patients from the large lying-in wards to the side wards. This was due to the difficulty of managing the beds owing to overcrowding, but probably explains the infection of the two last patients.

He deprecated the practice of admitting "failed forceps" and other probably infected cases into the labour ward with clean cases. He also stated that the blankets and bed-pans had come under suspicion as possible vehicles of contagion.

Mr. Currie then gave a brief account of 17 cases of puerperal peritonitis operated on by him in the last four years. Clinically they were divisible into three groups—peritonitis following abortion, atypical peritonitis early in the puerperium, and typical peritonitis late in the puerperium. In the atypical group there were nine cases with one recovery. The most constant signs were distension and free fluid; others were a sudden rise in temperature and pulse-rate, slight superficial tenderness, and diarrhœa. The treatment in each case was laparotomy and drainage. Until lately a tube had been left in the pouch of Douglas and removed after three days, but the drainage was slight. Latterly, therefore, the tube had been inserted just into the cavity and left for a week; and in the successful case thin serous fluid drained for three or four days, then changing to thick pus. Another patient had her operation on the third day, after complaining of severe abdominal pain. She had typical signs of appendicitis with peritonitis, and the appendix was gangrenous: she recovered. Three cases late in the puerperium had signs typical of peritonitis; all three had local abscesses and recovered after drainage. Four cases were post abortum. This class was less dangerous because the infection tended to be limited to the pelvis. Two were drained by posterior colpotomy, and recovered; two died after abdominal drainage.

Endometriosis and Ovarian Dysfunction

Dr. T. N. A. **Jeffcoate** (Liverpool) read a paper in which he said that endometriosis is a state in which there is excessive formation of endometrial tissue in the body, comparable in all respects with overgrowth of the uterine mucosa. As it was established that endometrial hyperplasia is due to the action of œstrin, and the condition had been produced experimentally in castrated women and animals, he thought it logical to conclude that excessive œstrin secretion was the most important factor in the growth of endometrioma in any site. He had made a clinical and pathological study of 111 patients with endometriosis, to determine in each case the presence or absence of the forms of ovarian dysfunction characterised by excessive secretion of œstrin—namely, metropathia hæmorrhagica, hyperfollicular disorder, and granulosa-cell tumour. The results were as follows:—

Endometrioma of the uterine wall alone (33 cases).—The average age of the patients was 45·5; the youngest was 30 and the oldest 57. Most of the patients were sterile (over half of the married) or had not conceived for some years before operation. The commonest symptom was excessive loss, and as a rule this was of the type occurring in metropathia—i.e., metrostaxis, often preceded by amenorrhœa. A part of one or both ovaries was examined in 7 cases. One or more follicular cysts were present in 4 patients; in a fifth a degenerating corpus luteum was present on the ninth day of the cycle, which strongly suggests hyperfollicular disorder. Recent lutein tissue was not seen in any other case. The uterine mucosa was examined microscopically in 19 cases (including 5 of the specimens reported on naked eye), and in 18 specimens the features of hyperplasia were present and the appearance of the resting stage was constant except that in two cases the stroma was œdematous. In the endometriomata themselves all the characteristics of hyperplasia were found in 29 specimens out of 34. It is submitted that the frequent finding of all features of hyperplasia in the endometrioma, with similar changes in the uterine mucosa, can only be caused by the influence which determines the latter—namely, œstrin. The time of the operation in relation to the date of the last period was noted in all cases. At least 21 should have shown premenstrual or menstrual features in the uterine mucosa, or the tumour, or both, but the secretory phase was present in two specimens only (both mucosa and endometrioma of one case). The evidence appears conclusive that most of the patients were suffering from a disease analogous to metropathia, while 2 certainly, and probably 5, had hyperfollicular disorder.

Extra-uterine endometriomata (78 cases).—Of these patients 46 showed no uterine involvement. The average age was 38·4: the youngest was 21 and the oldest 53. The age-incidence corresponds to that of hyperfollicular disorder rather than that of metropathia. Nearly half of the married were sterile, and of the parous many had long periods of sterility before operation. The commonest symptom was excessive bleeding (51 patients, in 27 of whom the lesion was entirely extra-uterine): 22 had metrostaxis, often preceded by amenorrhœa: 16 had menorrhagia, and 13 epimenorrhœa or epimenorrhagia. This, especially in the absence of uterine endometriosis, is striking. The appearance of the ovaries was not discoverable in 12 cases. Follicular cysts, often multiple, were present in one or both ovaries in 29 of the 67 specimens. These cysts were unaccompanied by recent lutein tissue, save in one instance in which the ovaries were removed from a patient with epimenorrhagia. The uterine mucosa was examined microscopically in 30 cases, and 28 showed hyperplasia and adenomyosis. In 8 cases the stroma was œdematous, possibly indicating hyperfollicular disorder. The large number presenting œdema of the stroma corresponds with the lower age-incidence in this group, and also with the higher incidence of epimenorrhagia. Of 79 specimens, 67 showed all the criteria of endometrial hyperplasia, though there was slight œdema of the stroma in 27. In the other 12 the small amount of distortion of the endometrial elements made it impossible to determine the presence or absence of hyperplastic features. The time of the operation in relation to the date of the last period was noted in all cases; at least 37 specimens should have shown menstrual, premenstrual, or post-menstrual changes in the tissue of the mucosa or of the endometrioma; these features were only found in 2 cases.

In both groups Dr. Jeffcoate considered it had been shown that endometriomata are always associated with ovarian dysfunction. Endometriosis occurred at the age at which dysfunction is common, and the associated sterility could be attributed to absence of ovulation. The histological findings in uterus, ovaries, and tumour, fitted in exactly with the theory of the ætiology he had advanced. The occurrence of fibromyomata with or without endometriomata was probably, he thought, due to the same factor. Clinically these tumours appeared at the same age-period as ovarian dysfunction, and were accompanied by the same symptoms—menorrhagia and sterility. Pathologically, specimens containing fibromyomata always showed evidence of ovarian disorder, such as follicular cysts and endometrial hyperplasia.

In conclusion, Dr. Jeffcoate maintained that his view of endometriosis explained better than any other the symptoms and pathology of the disease. It accounted for the recurrence of these tumours in patients who had had conservative operations, and explained why they did not develop when castration by operation or radiation has been performed. He added that although the ovarian disorder had been regarded for purposes of convenience as primary—that is, in relation to the pelvic lesions—the cause of the alteration in behaviour of the ovaries lay almost certainly in the pituitary gland.

Mr. A. **Gough** described a case of menstruation starting at the age of 29, and showed specimens of a syncephalus thoracopagus (subgroup diprosopus diophthalmus) and of a cervical fibroid obstructing labour.—Dr. E. A. **Gerrard** read a communication on dystocia due to rigid cervix following colporrhaphy.

EDINBURGH OBSTETRICAL SOCIETY

A meeting of this society was held on May 9th, with Dr. **Oliphant Nicholson**, the president, in the chair.

Cæsarean Section

Dr. W. F. T. **Haultain**, with Dr. E. M. **Robertson** and Dr. J. B. **Dewar**, contributed a study of 463 cases of Cæsarean section with special reference to the late results in 174 cases, particulars of which were obtained by writing to all the patients who had the operation at the Royal Maternity Hospital, Edinburgh, during the years 1925–31. It was found that the general health of the mother was usually excellent in the years after the operation. About 11 per cent. stated that they were not in good health, but as a number of these women suffered from cardiac disease, this was not surprising. Only 15 per cent. suffered from any abnormality of the menstrual periods, and it was interesting to note that amenorrhœa and scanty menstruation were as common as menorrhagia. Dysmenorrhœa was present in 7 per cent. of cases and was chiefly premenstrual in type. The most interesting result of the investigation, however, was the fact that in some 63 cases in which operation might have been followed by a pregnancy, no pregnancy resulted. It was difficult to account for this high sterility-rate. The fact that 14 patients were delivered naturally in the pregnancies following Cæsarean section showed that the old saying, "once a Cæsarean, always a Cæsarean," was by no means true in this series. Pain probably or possibly due to the operation was present in nearly 20 per cent. of the cases, but in only 8 per cent. was it sufficient to make the patient seek medical advice. Urinary symptoms were present in 13 per cent., the predominant complaints being frequency and painful micturition. Constipation was prevalent as a new symptom in 12 per cent. of the patients operated upon, and could be traced as a cause of pain in a number of those who complained of this symptom.

Vaginal Discharge of Non-infective Origin

Dr. R. CRUICKSHANK and Dr. A. SHARMAN (Glasgow) pointed out that an excessive discharge per vaginam might arise from any one of three sources—vagina, cervix, or uterus.

The tubular glands of the endometrium were the source of a small quantity of watery and highly alkaline secretion from the normal uterus. The secretion from the racemose glands of the cervix was thick, mucoid, normally small in amount, and definitely alkaline, the pH ranging from 8·0 to 9·0. The normal vaginal secretion—not a true secretion since there were no glands in the vaginal epithelium—was white, cheesy, highly acid in reaction and consisted of epithelial squames, Döderlein's vaginal bacilli, some transudate and lactic acid. The lactic acid, which was responsible for the high acidity, resulted from the breaking-down of glycogen in the vaginal epithelial cells, probably by bacterial action. These conditions were found in the vagina during reproductive life and for a short period after birth when glycogen was also present in the vagina. The deposition of glycogen there was probably controlled by the œstrogenic hormone.

By laboratory examination it had been possible to classify a series of over 40 cases of virginal leucorrhœa into two categories—infective and non-infective. In the first the organism was usually *Trichomonas vaginalis*. Among the non-infective cases hormonal disturbance was often strongly suggested, either by the patient's "make-up" or by gross menstrual dysfunction. Spontaneous remission of the discharge tended to occur at intervals. The average age at onset was low (19 years). Sometimes the complaint dated from puberty and in three of the series excessive discharge was noted before menstruation had begun. In four out of five cases examined, excess of œstrin was present in the urine, while radiological examination showed an unusually small sella turcica in three of five cases. On vaginal examination no lesions, inflammatory or otherwise, were discovered. Excessive discharge of non-infective origin might occur in non-virginal patients and in pregnancy it was very common.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE ASSOCIATION.—We published an abbreviated report last week (p. 1231) of a discussion upon the Treatment of Peptic Ulcer which took place at a special meeting of the Fellowship on May 30th. It should have been mentioned that a verbatim of this report would appear in the issue dated June 12th of the *Post-Graduate Medical Journal*, the organ of the Fellowship of Medicine, a copy of which costs 2*s*.

INTERNATIONAL CONGRESS ON RHEUMATISM IN MOSCOW

MAY 3RD–7TH, 1934

(FROM A CORRESPONDENT)

DELEGATES from 26 countries represented at the recent IVth International Congress on Rheumatism in Moscow had every opportunity of judging for themselves the degree to which the modern U.S.S.R. is desirous of welcoming western medical ideas, and the stage to which she has herself progressed. With regard to the former, it would be difficult for them to have returned home without feeling that they had been welcome guests whose opinion had been sought and valued. The progress of medical science is difficult to assess during a stay of rather less than a month. Certain impressions were shared by a majority of those who attended the congress, and who took part in the subsequent tour of Southern Russia.

At the outset it is a little bewildering for representatives of "capitalistic" countries to find that public health under socialism includes the whole of medicine and surgery. "When a citizen falls ill from any cause, it is the duty of the State to do something, and to continue to do something until he is back at work in his original condition of health." This was said by a distinguished professor of medicine in the course of an address of welcome to the delegates. How far this ideal of state medicine has been put into practice it would be hard to say. It seems true of the highest grade workers in the large factories, but in the country districts, medical aid is probably hard to come by and far less highly organised.

In the large towns there is evidently no lack of doctors; in one hospital of 500 beds the medical staff numbered over 200. On the other hand, nurses seemed scanty; it was mentioned to us as one of the contributory causes of the predominance of women doctors that much of the more skilled nursing work, such as the giving of enemas, medicines, and feeding, falls upon the medical staff. Another is the comparatively poor pay received by the medical man. The social position of the medical profession has however risen since the revolution, at which time the doctor was classed as a category III. worker, and as such found it difficult to survive. At the present time he draws a monthly salary about equal to that of the average factory worker (but far below that of the skilled engineer), and this sum is raised by 20 per cent. after two years of satisfactory work, and thereafter up to a fixed maximum. He can retire on a 75 per cent. pension at the age of 55, but need not do so until 70. Every doctor must hold at least one post under the State; should he be ambitious, or require a double salary, he may hold two or even more such posts provided that he works in each for a minimum of six hours daily, and "does some scientific work in his spare time." During the last two years the medical man has earned the privilege of sending his children to the university, and of buying his food at the same price as does the worker.

The attitude of the majority of the medical men we spoke with was one of enthusiasm and hope for the future. It was pointed out that in former times there existed no plan for a system of public health, whilst during the last seventeen years an ambitious and idealistic plan embracing the whole scope of medical science has been worked out, and is partially in operation. It has naturally proved difficult for the older men to adapt themselves to the new régime, although in many cases they have done so with apparent success. Many are occupying chairs. They are however subject to political supervision by their juniors. In every hospital a "purge" is called for at periods of three years, when a joint meeting of the complete staff from senior physician to furnace-men is held, and criticism of all from all is encouraged. Every action criticised must be defended. In Odessa, a radiologist to the State hospital had recently been dismissed for diagnosing a gastric ulcer in two cases, both of which died subsequently from other causes. The complainant was one of the nurses. The system is stimulating and probably healthy but offers opportunities of abuse.

Delegates to the congress had the unusual honour of an invitation to dine in the Kremlin as guests of Kalinin, the ex-peasant President of the U.S.S.R. This was no doubt in recognition of the fact that they represented the first international gathering held in Moscow since the beginning of the new régime. We were also received by Kuminski, the 34-year old Commissar for Health, who is a medical student. Sight-seeing tours and special performances at the opera were arranged in addition to the heavy programme of sanatorium and clinic visiting. The 6000 miles journey was made in a special train which was met everywhere by representative delegations from the ministries and medical societies. In Kiev, the new capital of the Ukraine, we were received in the magnificent new Academy of Sciences, whose President informed us that they now summarised their proceedings in English.

It was interesting to find the modern generation of medical men all over the country thinking but little of drug therapy. Physical medicine is acclaimed as the rational therapeutic procedure, and fine institutes for this purpose are erected in all towns. Due in part no doubt to the scarcity of drugs, there is a definite swing of opinion in this direction. Treatment and prophylaxis were emphasised everywhere as the aim of medicine; of diagnosis less was heard, and it may be that the length of the present medical course is insufficient to provide adequate training in diagnostic method. Much use is being made of the natural resources of the country; in the spas of the Caucasus, and in the Crimea and adjoining Black Sea riviera, countless sanatoria and rest-houses have been put up for all classes of worker. The army sanatorium, just completed at Sotchi by an American architect, is said, with little fear of contradiction, to be the finest in the world. It may be noted that everywhere the finest buildings are for the use of the army or the coming generation—kindergartens, creches, and schools. Great importance is attached to adequate holiday and rest periods for the workers in suitable surroundings as a preventive of disease; organisation of this kind has, it is said, reduced the incidence of chronic arthritis by one-third in the last ten years.

While it may be too soon to judge of the scientific accomplishments of the new Russian medicine the tour certainly revealed much of scientific interest, heightened no doubt by the new approach to familiar problems as a result of the break with more traditional schools of thought.

REVIEWS AND NOTICES OF BOOKS

The Medical Annual

A Year Book of Treatment and Practitioner's Index. Edited by H. Letheby Tidy, M.D., F.R.C.P., and A. Rendle Short, M.D., F.R.C.S. Bristol: John Wright and Sons; London: Simpkin Marshall Ltd. 1934. Pp. 644. Illustrated. 20s.

In the introduction to the 1934 volume the editors record an attempt to meet the criticism that this book is designed too much for the specialist and not enough for the general practitioner, and suggest with good reason that the family doctor will find useful material in the present issue. Dr. H. Letheby Tidy has succeeded the late Dr. Carey Coombs as medical editor. This year we have browsed chiefly among the medical entries, though those devoted to surgery and the specialties certainly deserve no less attention. Special interest attaches to the sections on anæmia and on dietetics, which are compiled with particularly sound judgment. Ketogenic diet was briefly mentioned in the 1933 volume, but the reference was too sketchy to be of any real value. Now more space is devoted to it under the headings of pyelocystitis and pyuria in children; a sample diet is given, also figures showing that satisfactory results have been obtained in a considerable number of cases. Recent work on vitamins is discussed in some detail, and this summary will be appreciated by those who try to keep pace with this rapidly growing subject. Due prominence is given to the successful transmission of influenza to ferrets, recorded in our columns a year ago. Alkalosis is discussed in connexion with the intensive alkali treatment of gastric and duodenal ulcers. When this form of treatment was first introduced much was written and spoken about the dangers of alkalosis; subsequently it was found that this complication was a relatively rare event. It is now a little disturbing to hear that of 200 cases treated in this way at St. Thomas's Hospital nine showed characteristic symptoms of alkalosis, and a detailed clinical picture is given. The great importance of its early recognition is clear from the fact that the symptoms are ignored, and alkalis are persisted with; the patient will die in coma, but if the treatment is stopped he rapidly recovers. The section on insomnia will be read with particular interest in view of the recent controversy over the uses and abuses of the barbitone derivatives.

The evergreen discussion on the significance of low voltage electrocardiograms is continued in this year's volume. Last year two investigators were reported as having come to the conclusion that low voltage electrocardiograms—i.e., 5 mm. or less—were of serious prognostic importance in a patient with heart disease. During the year other workers have published figures which limit the serious significance to low-voltage curves in lead II. or in all three leads, and emphasise the fact that no low-voltage curve is of great importance unless considered in conjunction with the clinical picture as a whole. An interesting report on the effects of age on the electrocardiogram should help to extend our knowledge of the variations from the so-called normal which can be safely neglected. Those interested in the study of stammering will find a long article on this subject explaining the basic difficulties of the stammerer and methods for circumventing them. The section on asthma records no outstanding advances during the year. The selection of the most significant among the very numerous contributions to the subject of rheumatic disorders must have been a difficult task; a helpful account is given of the International Rheumatic Congress held in Paris; also of the report of the Strangeways Collection, and of the report of the British Medical Association's committee. The article ends with an extensive bibliography.

In endocrinology the pituitary body has recently received much attention; an adequate account of our knowledge up to date is given, based chiefly on Cushing's work. A special article on National Health Insurance practice provides a historical summary and brief account of the present position of panel practitioners which contains a mass of condensed information which should be very useful to those who are puzzled by the intricacies of the service to which they belong.

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1. Modern Treatment in General Practice

Edited by Cecil P. G. Wakeley, D.Sc., F.R.C.S., F.R.S.E., Editor of the *Medical Press and Circular.* London: The *Medical Press and Circular.* 1934. Pp. 426. 10*s.* 6*d.*

2. Treatment in General Practice

Second edition. By Harry Beckman, M.D., Professor of Pharmacology at Marquette University School of Medicine, Milwaukee, Wisconsin. London: W. B. Saunders Company. 1934. Pp. 889. 45*s.*

1. The 56 articles of which this volume is composed originally appeared in the *Medical Press and Circular.* A statement by the publishers that the articles are written for the general practitioner reveals the difficulty in which the editor has been placed in deciding what medical information is particularly needed by the general practitioner which is not needed by the whole medical profession. Most of the essays are useful compilations of accepted views, and the authoritative tone of many of them is justified by the positions of the writers. The publishers can fairly expect a large circulation for the volume in response to its modest price.

2. Though described as a book on treatment this is, in fact, a text-book of general medicine, including dermatology and obstetrics. Dr. Beckman's method, and a very effective one, is to preface each article on treatment with a short historical and clinical summary of the disease concerned. Throughout he contrives to be comprehensive without being tedious, and definite without being dogmatic. Moreover, he has an engaging trick, not overdone, of asking the reader questions without himself supplying the answers. Among many other interesting methods of treatment discussed are the use of normal beef-serum in the treatment of anthrax, and of glucose-insulin-antitoxin in diphtheria. There is a valuable note on the management of diphtheria carriers. Dr. Beckman believes that all children, from six months to six years, should be immunised against this disease. Talking of the "influenzal" group of disorders, which he lumps together under the comprehensive term "Catarrhal Fever," he has nothing but scorn for the doctor who sticks heroically to his post with influenza upon him. His advice is "Go home when you feel it!" "Glandular Fever" (in inverted commas) is given as a synonym for epidemic sore-throat; true glandular fever is considered separately. The convalescent serum and adult whole blood-serum treatment of measles is well described, and the author wonders if all medical students know how to support an inflamed scrotum in mumps—presumably a reference to the time-honoured use of an empty champagne bottle. For pain or restlessness in pneumonia he advocates the opiates, though some will dispute the wisdom of giving morphia, for example, except in the early stages of that disease. The treatment of rheumatic fever by cinchophens and other methods less well known than salicylates is fully described; also chorea by nirvanol. Dissuasion, says Dr. Beckman, is the best sedative in typhoid delirium. The account of the modern treatment of syphilis is, perhaps, one of the best things in the book; it is taught that repeated negative C.S.F. Wassermann reactions should be the only acceptable standard of

cure. Some fourteen pages are devoted to meth
of inducing anæsthesia in obstetrics. Some practi
obstetricians will question the wisdom of deepen
anæsthesia in non-instrumental deliveries at
moment when the head is crowning. This is essei
ally the time when, by conscious coöperation betw
patient and attendant, perineal tears can be avoid

The book is racily written in good American, a
though Dr. Beckman takes an almost sadistic pleas
in splitting infinitives, his lively humour ma
this forgivable. The letter on page 28 should
framed and hung in every consulting-room or "offic
There is abundant optimism in this book which
practitioners should possess. Appended is a v
bibliography and a table of vehicles and incompatibl

Physics for Medical Students

A Supplementary Text-book. By J. S. Roge
B.A., M.Sc., F.Inst.P. Edited by T. H. Lai
F.R.S. Melbourne: Melbourne University Pre
Pp. 205. 11*s.* 6*d.*

This attractive book may well make us won
whether the medical student of to-morrow is goi
on in the same old way, learning his physics beca
he has to, or whether he is going to learn it w
a definite idea that it will be of assistance to him
medical work. Mr. Rogers has called his work
supplementary text-book, and certainly the mate
with which it deals is still outside the scope of
premedical of most universities. The subject mat
is well chosen, and in practically every branch
physics the author has taken up just those aspe
which seem to weld into medical science. T
brings us back to our starting point. As medi
science enlarges its borders in ever-widening circl
will it still be possible for those trained for the gene
practice of medicine to acquire sufficient knowled
of the basic sciences to equip them to tread th
outer regions, or will these have to be explored
others whose discipline has been deeper and l
wide? In any case this book is of a type of whi
more will be needed in the future.

Aids to Sanitary Science and Law

Second edition. By C. F. White, M.B., Ch.
D.P.H., D.T.M., Medical Officer of Health, P
of London; and H. Willoughby, M.R.C.
L.R.C.P., D.P.H., D.T.M. & H., Assistant Medi
Officer, Port of London. London: Baillië
Tindall and Cox. 1934. Pp. 321. 4*s.* 6*d.*

This little book, published in 1926, has been revis
with the object of bringing it up to date. It is intend
to include in small compass the sort of informati
which may be useful, as a supplement to knowled
obtained from larger text-books, to those studyi
public health for the D.P.H., for a medical qualific
tion, and for various other qualifications.
deals in 14 chapters with water-supply, air a
ventilation, food, sewage and refuse disposal, sit
and buildings, climate and meteorology, infecti
and disinfection, school hygiene, infant welfa
industrial disease and hygiene, tropical diseas
parasites, vital statistics, and sanitary law. This is
wide field to cover in a book of this size and comple
information cannot be expected. It would see
impossible, indeed, to deal with a subject like vit
statistics in ten small pages, and the many inaccuraci
and misleading statements in this chapter mar t
book. The chapter on sanitary law, also, is not

entirely successful attempt at compression, and space is wasted in description of procedure for repair, closure, and demolition of houses and the scheduling of insanitary areas according to the Housing Act, 1925, which were amended by the Act of 1930, some reference to which is made elsewhere. It is strange, too, to read in 1934 that the Vaccination Acts are (sic) administered by boards of guardians.

It is admittedly hard to know what should be selected from the wide province of sanitary science for those who are still students—even post-graduate students—but at least they ought to get nothing which is out of date and nothing which is not strictly accurate.

1. The Dermatergoses or Occupational Affections of the Skin

Fourth edition. By R. Prosser White, M.D., C.M. Edin., M.R.C.S. London: H. K. Lewis and Co., Ltd. 1934. Pp. 716. 35*s.*

2. The Common Diseases of the Skin

Second edition. By R. Cranston Low, M.D., F.R.C.P., Consulting Physician to Skin Department, Royal Infirmary, Edinburgh. London and Edinburgh: Oliver and Boyd. 1934. Pp. 317. 12*s.* 6*d.*

1. This work has become the standard text-book on its subject in all English-speaking countries. Its author, an excellent portrait of whom faces his memoir in this edition, died in his eightieth year last January, content that he had created a lasting record of an increasingly important branch of medicine. A reduction in the size of the type has reduced the number of pages from 734 to 716, although a considerable amount of new material has been added, with 14 new illustrations and an amplification both of the general index and that devoted to authors' names. The amount of information contained is really monumental, and must be of the utmost value to factory surgeons, dermatologists, assessors, and referees, and in the complicated cases that are continually being fought and discussed both in and out of court under the Workmen's Compensation Act, 1906. The abundant references—as many as six or seven in a footnote to some pages—bear witness to the energy and industry applied by the author and by Miss Anne Newbold, who compiled the indices in their collection.

The general plan and the headings of the 12 chapters remain unchanged.

2. The author of this excellent little book on the common diseases of the skin has contributed much to our knowledge of the mechanism of cutaneous allergy. The chapter on eczema alone is worth the modest cost of the whole volume. In general arrangement it follows the classic outlines of the larger text-books, and the 18 chapters are apportioned with due regard to ætiology where this is certainly known, and to the ruling clinical features where it is doubtful or obscure. The illustrations and diagrams reach a high standard of reproduction. Interesting examples of the diagrammatic method are the small line-drawing depicting the author's theory of the histopathology of alopecia areata (p. 161) and the anatomical diagram of the common sites for the eruption of herpes zoster of the head and face. Those depicting histological structure display great skill in indicating all that it is necessary for a student or practitioner to know, and no more detail than is essential.

EUGENICS IN PRACTICE

A Series of Essays suggested by the Report of the Brock Committee

VI.—TECHNIQUE OF STERILISATION

There must be few, if any, surgeons in this country who have or would wish to have any large experience in operations performed to render procreation or conception impossible. Vasectomy may be performed as part of the operation of suprapubic prostatectomy, and salpingectomy when there is strong medical reason for preventing pregnancy. In both these cases the operation may be regarded as prophylactic, in the first place to prevent epididymitis, in the second to avoid the dangers of pregnancy or labour in special cases. These cases present no ethical problem to the surgeon; provided the operation is safe and effective the justification is clear. It is not quite the same, however, when the operation is to be performed in the interests of the community or of the race, rather than in the interests of the patient and for a definite therapeutic indication.

Apart from the legal aspect—which it is presumed will shortly be made clear—the surgeon may have a doubt in his mind whether the good of the community constitutes a sound ethical justification for such an operation according to the spirit, if not the letter, of the Hippocratic oath. Though compulsory sterilisation need not be considered, seeing that it has been condemned by the Brock Committee, the consent of a mentally defective person may not entirely remove his doubts. The committee has however made out a strong case for voluntary sterilisation in certain classes of mental defect, and it is probable that the majority of surgeons will be convinced by the evidence and conclusions set out in the report. This evidence was conclusive on the essential point that sterilising operations (vasectomy and salpingectomy) produce only the result desired and have no ill-effect on the health or sexual life of the individual. On one point the committee was unable to give a definite opinion—viz., whether vasectomy performed before the age of puberty would interfere with physical maturity—and for that reason they were not in favour of the operation being performed until maturity was reached. Since the report was published, however, animal experiments carried out by Mr. J. Hammond, F.R.S., at the School of Agriculture, Cambridge, have shown that ligature of the vas before sexual maturity does not interfere with physical or sexual development or capacity for sexual intercourse (see letter from Mr. C. J. Bond, Brit. Med. Jour., Feb. 3rd, p. 212).

It is not only in cases of mental deficiency that sterilisation may be required. In most instances in which the writer has had occasion to do these operations the indication has been blindness in men and women who wish to get married. The committee of the institution by which these people are employed and cared for believes that it is undesirable from every point of view that children should be born to blind parents, and it is on these persons, at their own request and that of the chairman of the institution, that most of the operations have been performed. Sometimes it is the man who wishes to undergo the operation, sometimes the woman. When one considers the miserable fate of a child born to such parents, doomed to be separated at once from its parents and likely (in some of the cases at least) to be blind, one feels that sterilisation in cases of this sort is reasonable and humane.

Vasectomy and salpingectomy are the methods advocated by the Brock Committee, and no others need be considered. Castration, ovariotomy, and hysterectomy have disadvantages so obvious that they could rarely, if ever, be called for. Sterilisation in the female by means of X rays was considered and discussed in the Brock report and it was suggested that this method might occasionally be employed when, in the opinion of a psychiatrist, operation would have an unfavourable effect on the mental condition of the patient. One objection to X ray sterilisation is that, to be effective, a heavy dosage is required, which would probably (though perhaps not necessarily) completely destroy the functional activity of the ovaries and bring about an artificial menopause. Another is the risk of an ovum which has not received a fatal dose of radiation continuing to develop in a damaged form leading to defective or monstrous offspring.

VASECTOMY

This is satisfactorily performed under a local anæsthetic. The skin of the scrotum having been prepared in the usual way, the spermatic cord is taken up by the thumb, index and middle fingers of the left hand and the vas identified at the back of the cord and manipulated into a subcutaneous position. It is held there firmly with the skin stretched over it, while 1–2 c.cm. of 1 per cent. novocain is injected into the skin over the vas. It is convenient at this stage to fix the vas by a pair of light towel forceps (preferably with blunt points) below the point at which it is steadied by the fingers; the fingers should not be moved until the incision has been made. The vas is exposed by an incision about half an inch long and it is then secured by forceps or by passing a needle and catgut ligature under it. The fingers of the left hand may then be removed, and the vas ligatured above and below and divided between the ligatures. The wound is then closed. In most cases patients have been kept in bed for a day or two, though probably there is no necessity for this.

Vasectomy by this method is very simple and has the advantage over open dissection that there is less risk of injury to the spermatic vessels. It is generally advised that the incision should be as near to the external abdominal ring as possible; the important point is to choose a place at which the vas can be identified with certainty and held securely in a subcutaneous position while the incision is made.

As there is no definite evidence as to the duration of life of spermatozoa in the seminal vesicles, it is advisable, as suggested by Mr. Bond in his evidence before the committee, to forbid intercourse for a period of about three weeks after vasectomy.

SALPINGECTOMY

Simple ligature of the Fallopian tube is by no means an infallible way of preventing conception; even after ligature and division of the tubes cases have been reported where pregnancy has occurred. In fact it may be said that even after the most radical salpingectomy there is a remote possibility that an ovum may reach the uterus. However, for all practical purposes the usual method of performing the operation—as, for instance, after Cæsarean section—may be regarded as adequate. As this operation is only likely to be performed by gynæcologists or general surgeons of experience (as recommended in the report) it is hardly necessary here to go into details of technique. The writer's practice is to divide the tube about half an inch from the uterus, ligature the divided ends and to bury the proximal stump under the peritoneal covering of the uterus. A fold of the broad ligament may be stitched over the incision to obviate the possibility of a coil of bowel becoming adherent.

ASSURANCES TO THE PATIENT

If, as is here assumed, sterilisation is to be voluntary, it is desirable to go very carefully into the question both of efficiency and of possible risk. The Brock Committee inquired of a number of teaching hospitals in London and elsewhere, obtaining definite information from 22 places. Judging by the replies it seems quite clear that no prejudicial mental or physical effects have been known to follow double vasectomy; and the same is true of double salpingectomy, except that occasionally some regret may have been expressed for the loss of fertility. The Californian experience, as already noted, is equally definite on the point.

So much for the after-results. The operation itself may be regarded practically as free from risk in the case of the male; even the minor degree of shock which may follow ligature of the vas is avoided in the official German method, the vas being drawn within reach by passing a director behind it and simply divided, thus avoiding interference with the network of sympathetic and parasympathetic fibres contained in its sheath. There seems no reason to regard this simple division of the vas as likely to lead to restoration of the lumen. In practice urologists are well aware of the technical difficulties of restoring the lumen of a vas which has been narrowed or occluded by inflammation. American experience, however, suggests that vasectomy need not be regarded as permanent; a careful survey in California has shown that with proper technique operative restoration of fertility is not only possible but has been accomplished.

The position is rather different in the female, for although the risk to life of the operation may be slight it has to be taken into account. A surgeon has estimated the risk as comparable to that involved in a quiescent appendicectomy. There is, too, in the case of the woman no guarantee that sterilisation will be effective. Gynæcologists recognise the remarkable regenerative power of the Fallopian tube, and experimentally both crushing and tying operations have proved no safeguard against pregnancy. It was long supposed that the technique described by M. Madlener in 1919 had effectually circumvented nature. His method was to raise a knuckle of tube at its mid portion, crush it to paper thinness, and tie a ligature around the furrow, the loop thus including two portions of the tube and a portion of the mesosalpinx. Visualisation of the result by lipiodol has shown the hope to be unjustified, and recently two clinical failures have been reported, whether from the restoration of continuity, the formation of fistula between the peritoneal cavity and the tube somewhere in its course, or the slackening of the ligature. The official German method is based on the experience of A. Döderlein (Munich), who has since 1926 treated 30 cases by the method of Flatau. In this the tube is first rendered free by division of the mesosalpinx; it is then tied on itself in a knot and a silkworm ligature tied not too tightly around this knot. If carefully carried out there is little probability either of the lumen being restored or of any fistula formation. Although there is no mention of it in the German account presumably the possibility exists of restoring continuity if that should prove desirable by removal of the ligature. That has proved to be the case after temporary sterilisation by burying the fimbriated end of the tube beneath the peritoneum.

THE LANCET

LONDON: SATURDAY, JUNE 16, 1934

DIPHTHERIA AND THE HUMAN HERD

A NEW report by Surgeon-Captain S. F. DUDLEY and his colleagues[1] on the results of diphtheria immunisation in Greenwich Hospital School brings to a close a decennium of study of the remarkable epidemiological conditions which have obtained in the Greenwich School. Circumstances allowed of opportunity of observing, without interference, a human herd intensely infected with the diphtheria bacillus and the observers have made the best possible use of the occasion. This intense and continuous survey in relation to infection of a "semi-closed" institution with a population of approximately 1000, has few parallels in the literature of epidemiology. In 1921 permission was obtained to Schick-test Greenwich Hospital School where for some years much anxiety and sickness had been caused by diphtheria. Since then up to the time when Greenwich Hospital School left London in April, 1933, it has been possible to watch the distribution and production of immunity and infection with diphtheria bacilli in the institution. The fact that the authorities permitted Schick-testing from 1921, but withheld permission to inoculate the school against diphtheria until 1928, presented a unique opportunity to study the natural development of antitoxic immunity in a herd in which the diphtheria morbidity was exceptionally high. Had not the authorities banned the employment of anti-diphtheria inoculations it is unlikely that any modern immunologist would have dared to withhold artificial active immunisation in view of the serious drain on the time, health, and finances of the school, and no chance of studying the natural latent immunisation of the school would have occurred. Moreover the acceptance by the school authorities of inoculation against diphtheria in 1928 introduced a variable which allowed a close comparison of natural immunity, acquired by a community in which diphtheria was endemic, with a condition of immunity artificially induced by inoculation. It was found that three doses of diphtheria toxoid can produce in three months as high an immunity as three years' residence in a community where diphtheria is endemic; and further the natural process was necessarily accompanied by a high incidence of diphtheria, whereas artificial immunisation was followed by the almost complete disappearance of clinically recognisable diphtheria.

The intense degree of infection prevailing at the school during the period of observation may be judged from the following facts. During the years prior to the introduction of active immunisation the average number of cases of diphtheria notified per annum was 45. At one time during the survey 13 per cent. of the boys were carriers of the "gravis" type of bacillus, at another time over 30 per cent. of a sample of Schick positive boys became naturally Schick negative within four months. In such an institution latent immunisation proceeds at an extraordinary rate and it is calculated that three years' residence in the school produced as effective an immunisation as the usual prophylactic procedures. It must be emphasised that the natural immunity which was so induced was dearly bought. To every three or four latent immunisations one case of diphtheria occurred. It is generally accepted that in the normal population it is rare to find a Schick positive individual harbouring virulent bacilli without showing symptoms. At the same time if one accepts the "Durchseuchung" theory of the development of natural immunity to diphtheria one must suppose that most Schick positives must at some time or other harbour virulent bacilli. Under the conditions of intense infection at the Greenwich School five virulent carriers were found among 58 Schick positive boys. In this special series Schick positives were not significantly less likely to be carriers of virulent bacilli than Schick negatives. It may be noted, however, that in four out of the five Schick positive carriers, the Schick positive had been preceded by the Schick negative state, and it is likely that the boys had some measure of active immunity even though antitoxin had disappeared from their blood. After the methods of active immunisation had been introduced into the school, the "gravis" type of bacillus replaced the "mitis" as the prevailing type and coincident with this change there was an outbreak of "modified" diphtheria among boys who had been passed as Schick negative. The disease in these boys was mild and was mostly unrecognisable on clinical grounds but cogent reasons can be given for accepting the majority of them as genuine diphtheria. It is interesting to note that the incidence was greater among the artificially immunised than among the naturally immune. The circumstances were such as to put the greatest possible strain on modern methods of prophylaxis and these proved equal to the test.

A conclusion in the report which is likely to arouse controversy is that under certain conditions increase in the number of immunised individuals in a community increases the number of virulent carriers, and *ipso facto* the risk to the Schick positives of the same community. Such a possibility has often been contemplated by students of diphtheria prophylaxis but very little evidence that it is more than a possibility has hitherto been produced. Surgeon-Captain DUDLEY supports his closely sustained argument with observations outside the Greenwich School such as those of E. S. GODFREY, but we question whether these observations really support his contention. Nevertheless in matters of ecology it is recognised that interference in one direction may lead to unforeseen results in another and the provocative views advanced in this report are likely to stimulate investigation. The authors constantly remind us that the conditions at Greenwich were exceptional and what is true of that institution is not necessarily true of others. The key of the situation at Greenwich may perhaps be found by looking at the two photographs that serve as frontispiece to the report. One called "the human herd" depicts the Greenwich boys closely packed at dinner, and the other their grossly overcrowded sleeping quarters. Anyone with a sense of modern social progress might well wonder whether the phrase "the human herd" is here used in a scientific or in ironical sense, but perhaps in this case the meanings are not far apart.

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[1] Active Immunization against Diphtheria: its effect on the Distribution of Antitoxic Immunity and Case and Carrier Infection. By Sheldon F. Dudley, Percival M. May, and Joseph A. O'Flynn. Medical Research Council. Special Report Series No. 195. London: H.M. Stationery Office. Pp. 140. 3s.

Many who have studied the successive reports of the diphtheria infection at the Greenwich School must have been disposed to criticise the hygienic arrangements of the school. The Governors of the school, like the Pope's mule, have indeed saved up their kick for a number of years but it must be admitted that they have eventually used it to some purpose. Within the last year or two the school has been removed to splendid quarters in the country; it may be anticipated that in its new and ideally healthy environment it will cease to provide such a wealth of material for the study of herd infection. To the practical hygienist the end of trouble is not the least instructive part of it and we hope that the epidemiological history of the school will some day be continued, though it is likely to prove uneventful. It would, we think, complete an excellent commentary on the right and the wrong way of "herding" human beings. Meanwhile for those interested in the broader aspects of epidemiology and herd immunity, as well as those concerned with diphtheria prophylaxis, the report provides a mine of interesting data.

THE DETERMINATION OF POST-MATURITY

THE incidence and dangers of post-maturity of the fœtus are subjects on which writers and teachers of obstetrics are unduly reticent. It is perhaps too readily assumed that, where the calculated date of delivery has long passed, the patient has been inaccurate in recording her last menstrual period or that impregnation has immediately preceded the first missed period. Medical officers working in maternity hospitals have learned to place little reliance upon the statements of patients unless these are corroborated by the results of physical examination, and among such patients there are indeed many reasons why a wrong date for expected delivery may be offered either in good faith or to hide some failure to comply with rules or doctor's orders. Ignoring errors arising from inaccurate information or calculation which can often be corrected by physical findings, it is remarkable how many patients in actual obstetric practice do not spontaneously go into labour on the date which was expected for their delivery. Most of these ultimately produce babies which present the recognised signs of maturity in respect of length, condition of skin, finger nails, absence of lanugo, presence of plentiful vernix caseosa, and, in the male infants, testicles in the scrotum; and where these things are so it may be supposed that one or other of the common explanations will be correct. A few cases of pregnancy of longer than expected duration result in intra-uterine fœtal death which is followed at varying intervals by spontaneous delivery of a macerated fœtus and a placenta which has undergone degenerative changes indicative of senility, such as white infarcts of varying size. Investigation brings to light no explanation of the death of the fœtus beyond the microscopic appearance of the placenta which shows some degree of obliterating endarteritis of the small vessels. In other cases where delivery deemed overdue has occurred spontaneously or after induction of labour, the child at birth shows characteristics which are generally ascribed to post-maturity, the placenta also appearing senile. Such fœtuses are definitely longer than the normal 20 inches. The head is larger in all its diameters, the bones of the vault are harder, so that moulding is slight, and the sutures are narrow, so that overriding is minimal. A large unmoulded head obviously conduces to delay in the second stage of labour, and may result in laceration of the perineal body and even in stillbirth. The classical picture of such a post-mature child is with skin thicker and more opaque than usual, and colour nearer grey than the healthy pink of a normal fœtus at term. Peeling tends to occur all over the body, being especially marked on the palms of the hands and the soles of the feet. As the liquor amnii in these cases is usually green in colour from admixture of meconium, the threads of peeling skin are stained green or greenish-yellow, so that during the first few days after birth the child has a more or less piebald appearance until the peeling is complete. The nails of the fingers and toes extend beyond the tips of the digits. Presumably as a result of a placenta no longer sufficient, the child is usually very thin and its weight is low for the size of its skeletal framework. Whether this is a picture occurring significantly more often in children born after the expected date is not certain. It is at least possible that variations in rate of development occur in individual babies.

The proportion of children born alive after the expected time who show definite signs of post-maturity seems to have been somewhat neglected by those searching the records of maternity hospitals for statistical data, possibly because experience has made them sceptical of expected dates. But all obstetricians can quote cases that have been watched almost throughout the antenatal period and have failed to go into labour at term. When, because of the increasing size of the fœtus and the distress of the mother, pregnancy has been terminated a week or two after the expected date of delivery, a fœtus 20½ to 21½ inches in length has been born. One lying-in hospital records the following patients:—

A private patient whose virginity before marriage was not doubted was found to be 12 weeks pregnant 13 weeks after marriage; quickening occurred at 18 weeks, and engagement of the fœtal head at 36 weeks. Labour took place 34 days after the expected date, when delivery was effected by forceps of a female child weighing 10 lb. and measuring 22½ inches in length. In a second pregnancy labour was induced one week after term and the female child delivered weighed 9¼ lb. and measured 20½ inches. At the third pregnancy labour was induced at term and a mature male child was delivered who weighed 9 lb. and measured 20¼ inches. At the time of induction of the second and third labours the cervical canal was not taken up, and there were no signs of the onset of labour. Another patient gave birth to a female child weighing 7¼ lb. and measuring 21½ inches, born three weeks after the expected date of delivery. Induction of labour in the second pregnancy at term resulted in the birth of a female child weighing 6¼ lb. and measuring 20 inches.

When, whether because of the previous obstetric history of the patient or her present history or physical condition, post-maturity is suspected, the obvious course is to attempt to induce labour medicinally. The method of induction used in these circumstances varies in different clinics; a favourite one consists of the administration of a large dose of castor oil, followed by quinine or intramuscular injections of pituitrin in ♏iii doses at two-hourly intervals to a total of 2 c.cm. If labour fails to start after this treatment, it is highly probable that after all the patient is not at term, and therefore surgical interference would be contra-indicated. It is not, however, the choice of a method of induction that troubles the practitioner, but the determination of the criteria for intervention in any individual patient, and here obstetric literature gives him little help. Careful records of the case-histories of maternity patients among educated women might be of great value in estimating the frequency of pregnancy lasting longer than the expected duration of 280 days. Details of length and weight of fœtuses, with notes on cutaneous appearance and the condition of the placenta, would serve to determine how many of them showed the accepted criteria of post-maturity; and it should be remembered that evidence of stage of development of a fœtus is valueless unless it is supported by records of fœtal length, which is much less variable than its weight. X ray examination of the tibia immediately after birth may reveal a centre of ossification in the upper epiphysis of the tibia, of which the significance will depend on the sex of the child. Generally speaking this centre is manifest in girls before birth, but in boys does not normally appear until four weeks or even longer after birth.

DESENSITISATION FOR HAY-FEVER

Hay-fever is one of those minor maladies which the doctor, if not a sufferer himself, is apt to deal with a little light-heartedly, but which the patient cites as a reproach to the state of medical knowledge. In Germany the patient's protest has taken the form of a Hay-Fever Association which (appropriately enough) holds its annual meeting in the middle of the hay-fever season in some such refuge as the open treeless island of Heligoland. The medical adviser on the association's committee recently published a review[1] of the treatment of hay-fever, concluding with an imposing table—compiled apparently from the records of the association—in which the therapeutic effects of no fewer than 90 drugs and methods of treatment in over 2000 cases are set forth and analysed. He strongly advocates "rational therapy"—i.e., identification of the sensitising pollen by skin-testing (Urbach,[2] of Vienna, prefers the direct intranasal application of pollen extract on a swab) and subsequent desensitisation of the patient.

The German methods and results of desensitisation are critically considered by Hansen,[3] who treats from 300 to 600 cases of hay-fever annually in Lübeck. He finds, by skin-testing, that over 90 per cent. of his patients are sensitive to grass pollens, while from 10 to 20 per cent. of them are sensitive to the pollens of the lime tree and the acacia. His desensitisation follows Walker's method—namely, a series of 20 subcutaneous injections of increasing small amounts of pollen extract (from 0·2 c.cm. of 1 in 1,600,000 to 0·7 c.cm. of 1 in 5000) at three to four-day intervals, timed to end at the opening of the hay-fever season in the latter half of May. Alternatively he sometimes uses an intensive series of daily doses for a month, and sometimes spreads the course throughout the year. This treatment has enabled over 70 per cent. of his patients to run the gauntlet of the pollen season almost or quite without symptoms. In less than 10 per cent. it has failed completely. Hansen attributes some unsatisfactory results to the use of grass-pollen extract only, in patients sensitive to tree pollens as well, and others to inadequate dosage: he is emphatic that the early doses and the increases must both be small, while the final dose attained must be large. A successful desensitisation is seldom permanent, and in most cases the treatment must be repeated annually, at least for several years. Anaphylactic reactions of appreciable severity occurred once in every 300 injections, in the form of immediate shock, urticaria, œdema of the Quincke type, or focal exacerbations, and seemed to be relatively more common in women in the four days preceding menstruation; they were treated by the recognised procedure of applying a tourniquet above the point of injection and giving adrenaline and calcium gluconate. Rice[4] has recently added the refinement of applying a second tourniquet (in the form of a sphygmomanometer cuff) to the opposite arm above the site of injection of the adrenaline; this was done in a patient who had by accident received a gross overdose of pollen extract, and the rates of absorption of both extract and adrenaline could then be nicely controlled in accordance with the resulting symptoms by appropriate short relaxations of the two tourniquets.

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[1] Med. Welt, March 17th, 1934, p. 365, and 24th, p. 404.

[2] Med. Klin., Feb. 23rd, 1934, p. 253.

[3] Dent. med. Woch., Feb. 9th, 1934, p. 210, and 16th, p. 233.

[4] Jour. Amer. Med. Assoc., April 14th, 1934, p. 1222.

The experience of these German workers accords well with that of FREEMAN[5] in this country, described in our columns a year ago. Since the hay-fever season is now upon us, it is mostly too late to offer its victims for this year any but symptomatic treatment; but this is the time to assure them that if they will submit themselves to thorough desensitisation under careful and expert supervision, beginning about March, they will have some prospect of comfort next season.

UNEMPLOYMENT AND MENTAL DISORDER

THE number of unemployed people in England is lessening, but they are still an urgent problem in politics and national economy, and, though less obviously, in mental hygiene. It cannot be supposed that men can remain idle and impoverished for long periods without suffering harm to their mental health. If unemployment is considered without regard to this, its effective cure is likely to be delayed, however good the social measures for removing it. No one can tell what proportion of those long unoccupied would be unable for psychological reasons to return at first, or at all, to employment when it became available.

The absence of adequate information about the psychological effects of unemployment is probably due to the understandable reluctance of the unemployed man to submit to minute inquiry into his private life. General impressions are supplied by many people whose work brings them into contact with the problem, but these remain impressions, seldom confirmed by statistics and usually biased by the particular circumstances of the relationship or by the sentiments of the observer. A psychiatrist, for example, sees only those who have developed some form of mental disorder, and he might on inadequate grounds assume that these patients represented a fair sample of the unemployed or that in them unemployment was the main causative factor of their illness. A different but even stronger objection may be made against the use for scientific purposes of first-hand accounts of uncertain provenance. Those contained, for example, in a recently published work entitled "Memoirs of the Unemployed,"[6] are doubtless authentic, and are possibly as typical as the collectors hope; but the described method of collection leaves this uncertain. Such a book is painfully interesting; its anonymous authors tell individual tales of suffering and often of moral deterioration, undeserved and resisted, that cannot but excite sympathetic discontent at our imperfect social order, but they cannot be a basis for defensible opinions on the general physical or mental effects of unemployment. The concluding chapter, by Dr. MORRIS ROBB, shows how easily the observer may be led into dubious induction; a few patients whose mental illness is the selective factor, and second-hand accounts from friends and acquaintances, cannot be regarded as providing adequate material for the assessment he offers of the psychological effects of unemployment.

There is no reason to doubt that discontent, resentment, irritability, anxiety, depression, laziness, and other ills of the spirit commonly go in company with forced unemployment and unfilled leisure; there is no clear evidence for it, but it is probable and understandable. This is, however, by no means true of the morbid heightening of such effects which we see as mental disorder. In a carefully examined series of patients in whom psychosis or psychopathic disturbance of personality is associated with long-standing unemployment, the constitutional factor may be found to be more significant than the social situation in many cases. To say that "unemployment is often the immediate cause of a severe psychic illness" is to be dogmatic on poor grounds; such a causation is demonstrable only in rare instances. There is strong reason to believe that forced unemployment favours the manifestation of mental, as of physical, ill-health in predisposed persons, but in this it is not specific; it acts as do other adverse circumstances, and its importance has not yet been determined by a study of unexceptionable material. Material that is in other regards unexceptionable, such as that in the volume under consideration, does not meet the strict requirements for forming a medical judgment. It may be that general conclusions are here impossible, or that the necessary data are hardly to be collected; well-informed impressions are perhaps the best that can be obtained. In any case, though unemployment is an evil, all will agree, to be combated on medical as on social grounds, it is better to recognise the vagueness of our present knowledge of its effects than to let it be invoked as a cause of manifold mental troubles in much the same way as the war was invoked some years ago.

WALTER FLETCHER

WE publish elsewhere a letter setting forth the unanswerable reasons why a permanent memorial to the services of Sir Walter Morley Fletcher, first secretary of the Medical Research Council, should be instituted. It is signed by persons whose positions, official, scientific, and literary, are such that words in explanation of the authority with which they write would be intrusive, while the suggested form which the tribute to Fletcher's memory should take is admirable. First, they say, the memorial should be personal, and secondly it should be associated with the furtherance of the causes which Fletcher had so much at heart and for which he worked with such devotion and success. With all the signatories Fletcher must have come into close contact personally in Cambridge, London, and the social world, as well as officially, and they set out a simple and eloquent justification of his claims upon the memories of us all. The memorial should be instituted, and in the form suggested; we hope and believe that our readers will share this view, and help to make the movement a large and prompt success.

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[5] THE LANCET, 1933, i., 630.

[6] Memoirs of the Unemployed. Introduced and edited by H. L. Beales and R. S. Lambert. London: Gollancz. 1934. Pp. 287. 5s.

ANNOTATIONS

TRELOAR HOSPITAL COMPLETED

FOUNDERS' Day at Alton on Monday last gave the patrons of Lord Mayor Treloar Cripples' Hospital their first opportunity of seeing as a going concern the hospital completely rebuilt in bricks and mortar. It is one of the many remarkable features of Alton that for nearly thirty years the pioneer work of the hospital was carried on, and carried on efficiently, in timber structures remaining as a legacy of the South African War. The foundation-stone of the new buildings was laid nearly five years ago and for the last few months all the five new ward blocks have been in use. On Monday there was not a single bed in the wards; all the three hundred children were on the terrace, 984 feet long and 25 feet wide, which joins the five ward blocks and is the last word on sun-and-air treatment in this or indeed any country. Colonel the Hon. Frederick Lawson, chairman of the hospital, who welcomed the guests, including the Lord Mayors of London and Portsmouth, took the unusual course of saying nothing in commendation of the completed scheme, simply asking visitors to see for themselves and draw their own conclusions. The cost to date has been in the region of £150,000, and another £50,000 are required to rehouse the nurses and staff on the same modest but efficient scale, for although the hospital as such is complete, the administration is still suffering from lack of space and out-of-date equipment. During the afternoon the visitors found attraction in demonstrations of treatment in the new light department, of school handicrafts, of the manufacture of splints, and of remedial exercises. In conclusion we may recall a remark made in these columns when the rebuilding was commenced: when complete the Treloar Hospital will have a material framework worthy of the character and spirit of the work carried on within it. Happily that is now the case.

SPECIFIC THERAPY AGAINST TYPE III. PNEUMOCOCCUS

IN studies reported within the past two years O. T. Avery and R. Dubos have described the isolation from a soil bacterium of an enzyme active against the specific polysaccharide of the Type III. pneumococcus. Although the destruction of its capsular polysaccharide does not kill the pneumococcus it appears to render it susceptible to the normal defence mechanisms of the body, since the enzyme protects mice against infection and exerts a curative action on an experimental infection already established. K. Goodner, Dubos, and Avery later showed that a similar curative effect was exerted on rabbits previously infected by the intradermal injection of Type III. pneumococci. The effect of this enzyme, in vitro and in vivo, is, it should be noted, strictly type-specific. It does not attack the polysaccharides produced by other types of pneumococci, nor does it exert any protective or curative effect on infections produced with them. Two further reports from the Rockefeller Institute would seem to increase the probability that this enzyme may prove of service in the treatment of Type III. pneumonia in man. In the first,[1] T. Francis, Jr., and E. C. Terrell describe the production of a typical lobar pneumonia by the intratracheal or intrabronchial inoculation of Type III. pneumococci into Java monkeys (*M. cynomolgos*). The records of these infections are very complete. They include repeated blood cultures, repeated leucocyte counts, and repeated X ray photographs during life, and complete necropsies on those monkeys that died. There can be little doubt that the experimental disease in the monkey is closely similar to the natural disease in man. In the second paper,[2] Francis, Terrell, Dubos, and Avery report the results obtained in the treatment of these experimental monkey infections with the bacterial enzyme. They note the difficulty of obtaining adequate controls, because of the wide variations in the severity of the disease in untreated monkeys; but their results are clearly encouraging. They divide their treated and untreated animals into four groups, according to the severity of the bacteræmia during the first three days of the disease. In the two intermediate groups, with bacteræmia of moderate severity, the treated animals showed a definite advantage over the untreated controls. One of 24 treated monkeys died as against 18 of 32 untreated. In the mild infections there was little opportunity for the enzyme to give evidence of its therapeutic effect. No rabbit died in either group. In the severest cases it appeared to be relatively ineffective in modifying the course of the disease.

BACTERIOLOGICAL ANALYSIS OF WATER

THE tendency towards standardisation of technical procedure in routine analysis is exemplified in the report recently issued by the Ministry of Health on the bacteriological examination of water-supplies.[3] Hitherto every public health laboratory has employed its own technique, and it is not therefore surprising that discrepancies should have occurred in the reports of different analysts on the same samples of water. Where, as in water examination, an essentially quantitative technique is required, it is especially important that all workers should use the same methods; otherwise interpretation must vary from one laboratory to another. On the other hand, it is against the interests of progress to standardise too rigidly; a certain margin of freedom is not only permissible but actually desirable. The committee responsible for the present report [4] seem to have been well aware of this, and have therefore chosen to lay down detailed descriptions of the simple procedures, such as the agar plate count, while allowing a considerable latitude for the determination of the various indices of excretal pollution. An admirable description, likely to be of great assistance to the sanitary inspector, is given of the precautions to be observed and the points to be noted in the collection of samples, and a maximum interval of eight hours between the taking of the sample and the commencement of its analysis is recommended. In the analysis itself the old gelatin plate count is replaced by an agar count at 20–22° C., and most useful information is provided on the ways in which the experimental errors inherent in the plate count may be reduced to a minimum. In the determination of coli one

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[1] Jour. Exper. Med., 1934, lix., 609.

[2] Ibid., p. 641.

[3] The Bacteriological Examination of Water-supplies. Ministry of Health Reports on Public Health and Medical Subjects, No. 71. London: His Majesty's Stationery Office. 1934.

[4] Dr. T. Carnwath (Ministry of Health), chairman: Dr. M. M. Barratt (assistant bacteriologist, Lister Institute), Dr. John F. Beale (Counties Public Health Laboratories), Mr. H. T. Calvert, D.Sc. (Ministry of Health), Sir Alexander Houston, F.R.S. (late director of water examination, Metropolitan Water Board), Dr. W. M. Scott and Dr. F. R. Seymour (Ministry of Health), Mr. A. F. Standfast, Dip. Bact., and Prof. G. S. Wilson (respectively research worker and professor of bacteriology, London School of Hygiene and Tropical Medicine).

50 ml., five 10 ml., five 1 ml., and in certain samples five 0·1 ml. quantities of water are to be examined; and to avoid the customary but most unsatisfactory way of issuing the report as "Present in 10 ml., absent from 1 ml.," tables are provided, calculated from a formula based on the theory of probability, by which the most probable numbers of coli in 100 ml. can be determined. The further differentiation of coli into the fæcal coli, the intermediate, and the aerogenes-cloacæ types is made contingent on the probable number of organisms giving the presumptive coli reaction. Here the committee are very diffident in expressing an opinion. They suggest, however, that if less than two coli are present in 100 ml., the water is of sufficiently high standard to render differentiation unnecessary; again, if ten or more coli are present, the water is probably so bad that differentiation is waste of time. If, however, there are between two and ten coli per 100 ml., it is advisable to ascertain the proportion of the different types present. If they prove to be mainly fæcal coli, the water is condemned; if, on the other hand, they are mainly of the intermediate or aerogenes type, no immediate steps towards improving the source of supply need be contemplated. Appendices contain a description of the standards to which apparatus should conform, and of the preparation of the media that are recommended in the text. The report will be welcomed by all who are engaged both in the analytical and the administrative control of water-supplies.

NERVOUS COMPLICATIONS OF MUMPS

THE nervous complications which may precede, accompany, or follow an attack of mumps are varied and striking but fortunately rare. C. B. McKaig and H. W. Woltman[1] report the occurrence of myelitis, of which they can find only one other example in the literature, and take occasion to review the other nervous sequelæ. Their case of myelitis occurred in a girl of 16 years on or about the fourteenth day after an attack of mumps from which she had apparently recovered completely. General malaise and prostration lasting some hours was followed by intense pain between the shoulder-blades. Thereafter symptoms and signs of transverse myelitis at the level of the sixth cervical segment developed, although the subsequent course of the case led the authors to think that there was also extensive destruction of the cord below the level indicated. McKaig and Woltman consider that encephalitis is probably the gravest complication to be feared, although recovery is the rule and residual troubles for the most part clear up eventually. Meningitis may precede the parotid swelling but more commonly makes its appearance within the first two weeks after the attack, though according to A. Wallgren[2] it may be the sole manifestation of infection. The course of mumps-meningitis is benign. Lymphocytosis is the most constant finding in the cerebro-spinal fluid. Discussing neuritis and polyneuritis, McKaig and Woltman express the view that the lesions are more likely to be secondary to meningitis rather than to arise in the peripheral distribution of the affected nerves and that therefore the term meningo-radiculitis would be more appropriate. There are, however, several cases on record of flaccid paralysis of all four limbs associated or not with other paralyses. Although complete recovery is the rule, one case is reported of a fatal terminal bilateral diaphragmatic paralysis which followed mumps-tetraplegia in a woman aged 37.

Paralyses of the Duchenne-Erb and Aran-Duchenne type have also been recorded. Th. Merrill[3] describes a case of mumps in a woman of 65 in whom the right parotid only was affected and was not greatly swollen. The initial symptoms which persisted throughout the attack were severe earache and deafness. Ultimately the 2nd, 3rd, 7th, 8th, and 9th cranial nerves on the right side were involved, giving rise to characteristic paralyses which lasted for two months before disappearing completely. On the other hand, according to McKaig and Woltman, deafness following mumps is usually complete and permanent. Fortunately it is unilateral in three-quarters of the cases, occasionally on the side opposite to the parotitis. The onset is rapid and may be accompanied with tinnitus and vertigo; the usual explanation is that a sudden exudate into the labyrinth has occurred. Mental disturbances in mumps are uncommon but may coincide with the onset of orchitis when they usually take the form of violent delirium lasting a few days. Psychoses such as hallucinations and depressive mania have also been reported. Many years ago M. H. Gordon[4] showed that the causal agent of mumps was a filtrable virus and recently C. D. Johnson and E. W. Goodpasture[5] have confirmed this; but it is not definitely known whether the same agent is responsible for both the parotitis and the nervous manifestations, or whether the latter arise as a result of activation of a virus already present in the nervous system. McKaig and Woltman note in this connexion that the results of serial and repeated spinal punctures suggest the involvement of the nervous system in most cases of mumps and that nervous symptoms may precede the parotitis.

COÖRDINATION OF MEDICAL RESEARCH IN EAST AFRICA

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It is poisonous in concentrations of about 1 in 3000

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50 ml., five 10 ml., five 1 ml., and in certain samples five 0·1 ml. quantities of water are to be examined; and to avoid the customary but most unsatisfactory way of issuing the report as "Present in 10 ml., absent from 1 ml.," tables are provided, calculated from a formula based on the theory of probability, by which the most probable numbers of coli in 100 ml. can be determined. The further differentiation of coli into the fæcal coli, the intermediate, and the aerogenes-cloacæ types is made contingent on the probable number of organisms giving the presumptive coli reaction. Here the committee are very diffident in expressing an opinion. They suggest, however, that if less than two coli are present in 100 ml., the water is of sufficiently high standard to render differentiation unnecessary; again, if ten or more coli are present, the water is probably so bad that differentiation is waste of time. If, however, there are between two and ten coli per 100 ml., it is advisable to ascertain the proportion of the different types present. If they prove to be mainly fæcal coli, the water is condemned; if, on the other hand, they are mainly of the intermediate or aerogenes type, no immediate steps towards improving the source of supply need be contemplated. Appendices contain a description of the standards to which apparatus should conform, and of the preparation of the media that are recommended in the text. The report will be welcomed by all who are engaged both in the analytical and the administrative control of water-supplies.

NERVOUS COMPLICATIONS OF MUMPS

THE nervous complications which may precede, accompany, or follow an attack of mumps are varied and striking but fortunately rare. C. B. McKaig and H. W. Woltman [1] report the occurrence of myelitis, of which they can find only one other example in the literature, and take occasion to review the other nervous sequelæ. Their case of myelitis occurred in a girl of 16 years on or about the fourteenth day after an attack of mumps from which she had apparently recovered completely. General malaise and prostration lasting some hours was followed by intense pain between the shoulder-blades. Thereafter symptoms and signs of transverse myelitis at the level of the sixth cervical segment developed, although the subsequent course of the case led the authors to think that there was also extensive destruction of the cord below the level indicated. McKaig and Woltman consider that encephalitis is probably the gravest complication to be feared, although recovery is the rule and residual troubles for the most part clear up eventually. Meningitis may precede the parotid swelling but more commonly makes its appearance within the first two weeks after the attack, though according to A. Wallgren [2] it may be the sole manifestation of infection. The course of mumps-meningitis is benign. Lymphocytosis is the most constant finding in the cerebro-spinal fluid. Discussing neuritis and polyneuritis, McKaig and Woltman express the view that the lesions are more likely to be secondary to meningitis rather than to arise in the peripheral distribution of the affected nerves and that therefore the term meningo-radiculitis would be more appropriate. There are, however, several cases on record of flaccid paralysis of all four limbs associated or not with other paralyses. Although complete recovery is the rule, one case is reported of a fatal terminal bilateral diaphragmatic paralysis which followed mumps-tetraplegia in a woman aged 37. Paralyses of the Duchenne-Erb and Aran-Duchenne type have also been recorded. Th. Merrill [3] describes a case of mumps in a woman of 65 in whom the right parotid only was affected and was not greatly swollen. The initial symptoms which persisted throughout the attack were severe earache and deafness. Ultimately the 2nd, 3rd, 7th, 8th, and 9th cranial nerves on the right side were involved, giving rise to characteristic paralyses which lasted for two months before disappearing completely. On the other hand, according to McKaig and Woltman, deafness following mumps is usually complete and permanent. Fortunately it is unilateral in three-quarters of the cases, occasionally on the side opposite to the parotitis. The onset is rapid and may be accompanied with tinnitus and vertigo; the usual explanation is that a sudden exudate into the labyrinth has occurred. Mental disturbances in mumps are uncommon but may coincide with the onset of orchitis when they usually take the form of violent delirium lasting a few days. Psychoses such as hallucinations and depressive mania have also been reported. Many years ago M. H. Gordon [4] showed that the causal agent of mumps was a filtrable virus and recently C. D. Johnson and E. W. Goodpasture [5] have confirmed this; but it is not definitely known whether the same agent is responsible for both the parotitis and the nervous manifestations, or whether the latter arise as a result of activation of a virus already present in the nervous system. McKaig and Woltman note in this connexion that the results of serial and repeated spinal punctures suggest the involvement of the nervous system in most cases of mumps and that nervous symptoms may precede the parotitis.

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It is poisonous in concentrations of about 1 in 3000 of air and dangerous in concentrations of 1 in a thousand. It is moreover very volatile, boiling at 46° C., and yielding a vapour which will fire at 125–135° C.—not very much above the boiling point of water. The flash point of the liquid is below minus 20° C. Most chemists who have used carbon bisulphide as a laboratory solvent have experience of the readiness with which it will ignite when only ordinary precautions are taken, and of the choking smell of the sulphur dioxide produced when it burns. A liquid which easily yields a highly poisonous and inflammable vapour and a poisonous product of combustion is, clearly, a source of danger to those who use it, and compulsory notification of carbon bisulphide poisoning in accordance with the order of the Secretary of State of Dec. 31st, 1924, is obviously a wise precaution.

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EVIPAN AND ASTHMA

SINCE evipan is at the present time finding great favour, particularly for use on patients whose respiratory mechanism is at fault, its effect in a case reported in the *Münch. medizin. Wochenschrift* of Feb. 16th (p. 257) is noteworthy. The patient was a woman of 39, a subject of pulmonary tuberculosis and of asthma, on whom it was desired to perform a short gynæcological operation. Evipan in a 3 c.cm. dose was injected over a period of six minutes—i.e., at a rate slower than usual. The respiration came to a standstill and it was only after intravenous injection of 10 c.cm. coramine and the performance of artificial respiration that it was restarted after some minutes. That the author, Dr. P. Feldweg, regards this experience as a warning against the use of evipan on asthmatic subjects is made clear in the significant title of his article, "Bei Asthma kein Evipan"!

CONFERENCE ON VITAMIN STANDARDISATION

AN international conference on vitamin standardisation is being held this week at the London School of Hygiene and Tropical Medicine, under the auspices of the Permanent Commission on Biological Standardisation of the Health Organisation of the League of Nations. The following are taking part in the Conference, over which Prof. E. Mellanby is presiding: Prof. J. C. Drummond (University College, London); Prof. H. V. Euler (Stockholm); Prof. L. S. Fridericia (Copenhagen); Prof. B. C. P. Jansen (Amsterdam); Prof. P. di Mattei (Pavia); Prof. E. M. Nelson (Washington, D.C.); Prof. E. Poulsson (Oslo); Madame L. Randoin (Paris); Prof. H. Steenbock (Wisconsin); Prof. A. Szent-Györgyi (Szeged); with Dr. W. R. Aykroyd (League of Nations, Geneva) and Miss H. Chick, D.Sc., Technical Secretaries. The following are attending the Conference as observers: Dr. M. H. Brown (Connaught Laboratories, University of Toronto); Miss K. H. Coward, D.Sc. (Pharmaceutical Society of Great Britain); Mr. P. Hartley, D.Sc. (National Institute for Medical Research); Dr. Lormand (Laboratoire National de Contrôle des Médicaments, Paris); Dr. Mendez (Instituto Tecnico de Farmacobiologie, Madrid); Dr. M. Tsurumi (Japanese Delegate to the Health Committee of the League of Nations); Dr. A. Jung (University of Bâle). This Conference is the second of its kind. The first Conference, held in 1931, established standards and units for vitamins A, B, C, and D, which have since been widely used in many countries throughout the world. Although the standards originally recommended have on the whole worked well, the rapid advance of scientific work in this field has made it necessary to review th findings of the first conference in the light of recentl acquired knowledge. Several vitamins are no available in a relatively pure state, and it is probabl that the present conference will recommend th replacement of the standards chosen in 1931 b purer preparations than were available at that date especially in the case of vitamins C and D.

ADRENAL DENERVATION

Dr. Crile is now able to summarise [1] no less tha 308 cases in which denervation of one or both of th suprarenal glands has been carried out. He find that the unilateral operation, performed in 52 cases is followed by no ill-effects but is less effective tha the bilateral; the latter, however, is occasionall followed by attacks of vomiting and diarrhœa. Hi 308 cases include 76 of neurocirculatory astheni (hyperadrenalism), 79 of hyperthyroidism, 37 o peptic ulcer, 40 of epilepsy (in some of which adrena lectomy was done), and a few of diabetes. Th clinical results are stated to be good. Of the patient with neurocirculatory asthenia, 87 per cent. wer cured and 7 per cent. improved. Of those wit hyperthyroidism, 95 per cent. were cured. Th treatment advocated for the majority of thyrotoxi patients is thyroidectomy, adrenal denervation bein reserved for those with residual or recurrent hyperthyroidism. In the cases of peptic ulceration, it i stated, cure followed in 93 per cent. and improvement in 7 per cent., and Crile does not hesitate t recommend the operation when the customar medical and surgical treatment has failed. Of th epileptic patients, 33 per cent. are described a improved or cured. Adrenal denervation is held t be contraindicated in established cases of hypertension, and has proved useless in Raynaud's diseas and scleroderma. The series included two deaths both due to serious injury to the adrenal glands.

AFTER discussing many aspects of medical education (see report on page 1306) the General Medical Council appointed a Curriculum Committee with the following membership: Dr. H. L. Tidy (chairman); Prof J. B. Leathes; Prof. J. S. B. Stopford; Sir George Newman; Dr. H. G. Dain; Prof. L. P. Gamgee; Prof. R. J. Johnstone; and the president ex officio. This committee is to consider information and proposals received by the Council with respect to the revision of the curriculum, and to report to the Council.

THE Albert medal of the Royal Society of Arts for 1934 has been awarded to Sir Frederick Gowland Hopkins, president since 1930 of the Royal Society, "for his researches in biochemistry and the constituents of food." This medal was instituted in 1862 as a memorial to the Prince Consort, sometime president of the Society, and is awarded annually for distinguished merit in promoting arts, manufactures, or commerce.

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[1] Crile, G.: Amer. Jour. Surg., May, 1934, p. 378.

A DISCUSSION on the Nature of Sex and its Sociological and Legal Implications will take place in the section of obstetrics and gynæcology of the Royal Society of Medicine on Friday, July 6th, at 8.15 P.M., and the members of the Medico-Legal Society have been invited to take part. Sir Bernard Spilsbury, president of the Medico-Legal Society, and Lord Riddell will, it is hoped, join in the discussion.

PROGNOSIS

A Series of Signed Articles contributed by invitation

VI.—PROGNOSIS IN JUVENILE RHEUMATISM*

In juvenile rheumatism the disease of the heart arditis) is not only the sole cause of death, but the ly manifestation of the infection which may lead permanent damage. All the other lesions clear completely. Persistent joint disease is not a quel to acute rheumatic arthritis. Subcutaneous odes may linger long before they disappear. Even orea, though it may last off and on, more or less, r two years or more, or may be subject to relapses r several years, will, if the child survives, ultimately bside, leaving much the same type of nervous stem as before its development. It may, however, appear later during pregnancy.

We are, therefore, mainly concerned with the rognosis in rheumatic heart disease in young subects ; and it is well recognised that nothing like ccuracy in this matter can be attained owing to one pecial factor—namely, the great tendency shown by ll rheumatic children to develop recrudescences of heir infection. The heart of a child, once compensation is established, never deteriorates, still less breaks own, from mere mechanical overstrain ; it is always resh infection that turns the scale against it. And he same is true to a far greater extent than is generally ecognised in the rheumatic heart disease of adults.

Thus, when considering prognosis in juvenile heumatism, we have first to discuss the liability to uture reinfections. But before going into detail, ince the outlook differs very materially in cases n which the heart disease is mild and those in which t is severe, it is necessary to describe in what sense hese terms are to be used here. In the *mild* class nay be grouped cases showing tachycardia without bvious heart defect ; those showing mitral incompetence with only moderate enlargement of the left ventricle ; and those showing an apical mid-diastolic bruit with or without a mitral regurgitation of moderate degree. In the *severe* group may be included hearts that have suffered from serious pericarditis (and seldom is it anything less than serious), and those showing mitral incompetence with considerable ventricular enlargement (the apex-beat being an inch or more outside the nipple line), or complicated by the presence of aortic regurgitation or pericardial adhesions. Mitral stenosis, fully developed, is a rarity in childhood ; it must be classed amongst the severe cases.

Liability to Fresh Rheumatism and Carditis

It is agreed that juvenile rheumatism is overwhelmingly a disease of hospital, as opposed to private consulting, practice ; and environmental factors play so great a part in its production (or unmasking) that we can only act on the assumption that no rheumatic child, living in its own home and attending compulsorily an elementary day-school, is ever free of the danger of relapse. Nor, unfortunately, will prolonged sojourn in ideal surroundings away from home ensure it against serious relapses on its return to its original environment. But although this is undoubtedly true, experience teaches us that there are large numbers of rheumatic children in whom the outlook is quite favourable. To what proportion of the whole rheumatic child population this applies depends on whether we include such early and slight cases as are seen in a rheumatism supervisory centre or outpatient department, or think only in terms of rheumatic in-patients ; for it is the early and slight cases that do well, and the severe and advanced cases that do badly. Nor is this altogether the trite saying that at first glance it appears to be, for it connotes that it is not as a rule the cases in the mild group which deteriorate to become the cases of the severe group. For some years now it has been my experience that when a really severe case of rheumatic heart disease, the so-called cardiac cripple, comes under observation it is rarely a child whom one has had under care previously ; on the contrary, it is nearly always the case that such a child comes first under observation with its heart irreparably damaged.

MILD GROUP

Supervising a large number of rheumatic children whose hearts are unaffected or only slightly diseased, it is gratifying to watch how well most of them do. It is exceptional for them to suffer from such relapses as require in-patient treatment ; and it is still rarer for them to develop serious heart disease. In a few instances aortic regurgitation may develop, often insidiously ; and occasionally the signs of mitral stenosis may supervene, but this lesion may be largely the result of healing rather than fresh inflammatory processes. In children who have been through one or two attacks of rheumatism (in-patient type) without developing persistent heart disease the outlook is likewise good, and it is uncommon for them to acquire such heart trouble in any further relapses which they may have. Personally, I think too that in these early cases the enucleation of septic tonsils has its best chance to safeguard rheumatic children from the more serious forms of their disease. The operation will not necessarily prevent reinfections set up by epidemic hæmolytic streptococcal sore throats, since in these the lateral walls of the pharynx may be severely attacked ; but in my opinion it prevents the spontaneous attacks of tonsillitis to which rheumatic children are so prone, and renders carditis less frequent and convalescence cleaner and less prolonged. In this large group of rheumatic children, with at most only the milder form of heart disease as defined above, the outlook is favourable, and it is to be hoped that the supervision and periodic re-examination given at a rheumatism centre are factors in producing this happy result. They do quite well remaining at home and attending school. For the worst of them the schools for physically defective children are invaluable ; partly owing to their own régime, partly owing to the escape from the harmful effects of compulsory attendance at an ordinary elementary school. Special care should be taken of the children during the winter months and after epidemic catarrhs, scarlatina, and diphtheria. Holidays should be spent when possible with relatives in the country rather than at convalescent or holiday homes, which are rarely suitable for rheumatic children.

SEVERE GROUP

In the class with severe heart disease the outlook is, as might be expected, much worse than in the

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[*] Previous articles in this series were General Principles by Dr. Robert Hutchison, March 31st Prognosis in Gall-bladder Disease by Prof. D. P. D. Wilkie, April 7th ; Prognosis of Diabetes in Children by Dr. R. D. Lawrence, April 14th ; Tuberculous Laryngitis by Mr. Harold Barwell, April 21st ; Prognosis in Enlargement of the Prostate by Prof. C. A. Pannett, April 28th ; and Prognosis in Eczema by Dr. Henry MacCormac May 5th.

group already described. Compared with the milder group they are still more prone to reinfections; such relapses rarely fail to affect the heart, and often fresh carditis is almost the sole feature of the reinfection. In addition, in the worst cases, the heart deteriorates insidiously between the obvious recrudescences. Epidemic catarrhs frequently set up serious carditis, which is one reason against massing such children together for treatment. Tonsillectomy, although it may lead to improved general health, is far less successful in preventing fresh attacks of carditis than in the milder and earlier cases.

In these two groups of rheumatic children, the mild and severely affected, the outlook is very different. In both groups there are exceptions. In the second group there are not a few instances in which the tendency to relapse subsides, and the ultimate result is more satisfactory than could have been anticipated. In the milder group the number of exceptions is small, and it is rare to watch this type of case go steadily to the bad.

Static Cases

Fortunately there are many children who, although acquiring heart disease in an early attack, cease to develop any further attacks. It is not possible to be sure in which instances this will happen; but, very roughly, such a favourable course is predisposed to by good social environment, a quick return to good constitutional health, and absence of tonsillar sepsis. In these circumstances the youth of the patient, combined with the freedom of the coronary arteries from disease, tend to make the myocardial compensation extraordinarily efficient and capable of carrying on without trouble to late middle age or longer. In about one-quarter of the cases of established mitral regurgitation of mild type, the heart will make a complete recovery within five years. Aortic regurgitation, once established, is permanent.

Fatal Cases

Deaths during childhood are rare in acute rheumatism. Occasionally the infection, even a first attack, will overwhelm a child, and pericarditis may kill even in a few days. In another group the fatal issue can be long foretold. Such children usually show severe pericardial adhesions, and as the years pass the child's periods in hospital become more prolonged and its times at home shorter, until somewhere between the ages of 12 and 18 renewed carditis causes death. I have known several such children to fall down dead although not thought to be in any particular danger at that moment.

In a third group the outlook is much more uncertain. The child, who has severe heart disease and usually a history of pericarditis, develops relapse after relapse; and then unexpectedly an attack develops which gets altogether out of hand, and after a long spell of fever the child succumbs. Subcutaneous nodules may be a feature in such a case, and pericarditis is almost invariably present, although, owing to repeated past attacks, the pericardium is so abnormal that no friction may be audible. Such cases deserve the clinical title of malignant rheumatic carditis; true pathological malignant infection, supervening on a rheumatic valvulitis, is a rare fatal sequence in childhood.

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THE PREVENTIVE ASPECTS OF MEDICINE

A Series of Lectures in progress at King's College Hospital Medical School

XXV.—PUBLIC AGENCIES WHICH EXIST FOR THE PREVENTION OF DISEASE

(*Concluded from p. 1247*)

The Health of Children and of Expectant, Parturient, and Nursing Mothers

THE most remarkable development in public health work this century has been the establishment of the maternity and child welfare and the school medical services. So far as the reduction of infantile mortality is concerned, the former has scored a great success. A rate of infantile mortality in England and Wales of 132 deaths per 1000 births 30 years ago is now, in 1933, only 64. There are, however, disappointments; one is that maternal mortality is still far too high and shows little tendency to reduction, and another is that neonatal mortality (deaths under one month) is almost as intractable. The local authorities who administer these services may be either the county councils or the district councils and sometimes a district council administers the maternity and child welfare service and the county council, the school medical service. The latter is always, however, controlled by the education authority of the area, which may be the county or the district council. county boroughs, of course, administer both services.

An important part in the supervision of the welfare of expectant and parturient mothers is exercised by midwives, who, in some parts of the country, are responsible for 80 per cent. or even 90 per cent. of the deliveries. The work of the midwives is supervised by inspectors of midwives appointed by the local supervising authorities under the Midwives Acts—i.e., the county and county borough councils and a few of the largest district authorities.

The Central Midwives Board make rules for regulating the conduct of midwives and any serious breach of the rules is reported to the Board by the local supervising authority. The case is heard by the Board and the name of the midwife may be removed from the roll. Under the rules of the Board the midwife must summon a doctor in the event of certain specified complications arising or if progress is unsatisfactory. In these circumstances the local supervising authority pay the doctor's fee in accordance with a scale prescribed by the Ministry of Health. The local supervising authorities are responsible for prosecuting at the local police-court any uncertified person who delivers women in childbirth except in emergency or under the personal direction and supervision of a registered medical practitioner.

For the purpose of reducing maternal mortality and morbidity, most maternity and child welfare authorities now provide antenatal clinics, maternity homes or hospitals, and postnatal clinics. They supply "home helps" to assist in the domestic work of the house during the mother's confinement. Sterilised dressings, extra nourishment for necessitous expectant and nursing mothers, provision of the midwife's fee in cases of necessity, services of a consulting obstetrician and bacteriologist, particularly in cases of puerperal pyrexia or puerperal fever, hospital treatment or home nursing for puerperal fever or pyrexia or ophthalmia neonatorum are also provided. In fact, there is complete provision for the welfare of expectant, parturient, and nursing mothers.

Though it has often been discussed there is no compulsory notification of pregnancy, though, in a few places, there is a scheme of voluntary notification by a midwife. In practice, most expectant mothers of the class which needs help from a local authority notify themselves by attending the local authority's antenatal clinic or by letting the health visitor know when she happens to be in the vicinity. But with regard to the fact of birth, there is compulsory notification within 36 hours of its occurrence to the medical officer of health, and this is in addition to registration within six weeks of birth by the registrar of births.

This notification has been obligatory since 1915, and imposes the duty not only upon the attendant at the birth but also on other persons present in the house. The purpose of the notification is to enable the health visitor who receives the notification from the medical officer of health to know where her services are required. Her duty is to visit the mother and to give her such advice as is necessary with regard to the upbringing of the child. She visits at regular intervals up to the end of the second year, and in many areas until the child is 5 years of age or has started school and comes under the medical supervision of the school medical service.

The maternity and child welfare authorities also provide infant welfare centres to which mothers bring their children for regular weighing and inspection by a doctor. These centres are not for sick children but for the purpose of keeping healthy children healthy. If they are sick they are referred to a private doctor or to a dispensary or hospital.

There are now 2783 infant welfare centres in England and Wales. Free milk is provided for necessitous children and dried milk is often sold at cost price. The main function of these centres is educational and, in addition to the individual instruction of the mothers, class teaching and lectures are given. There is a home nursing service in connexion with most maternity and child welfare schemes. It is generally given by district nurses and is available for cases of measles, whooping-cough, epidemic diarrhœa, and other specified conditions.

THE SCHOOL MEDICAL SERVICE

The school medical service had its origin in 1907, though Bradford, London, and other places had started such a service a little earlier. It affords the only example of routine medical inspection of a definite and important section of the community. All elementary school-children are subjected to routine medical inspections at entrance to school, at age 8, and at age 12. In London there are four routine inspections, at entrance, at ages 7 and 11, and just before the child leaves school at the age of 14 years.

In addition, the children are examined by a *school nurse*, primarily to ensure cleanliness of the head and body, two or three times a year. She notes any abnormality and refers such cases to the school doctor for special examination. Some 18 per cent. of the children are found, at routine medical inspections, to require treatment for some disease or defect apart from dental caries or lack of cleanliness.

School clinics.—It was soon found that facilities for treatment, either by private doctors or at hospitals, were inadequate, and these clinics were therefore established, of which there are now 1855. They deal mainly with minor ailments (impetigo, sore eyes, and so forth), prescription of spectacles, removal of adenoids and enlarged tonsils, ionisation treatment of otorrhœa, and X ray treatment of ringworm. The children are also inspected regularly by dentists, and dental treatment is afforded at the clinics. At some clinics orthodontic treatment is provided. A small charge is made for treatment (except for the prescription of spectacles) at school clinics, but it is remitted in necessitous cases.

The maternity and child welfare and school medical services also provide an orthopædic service with a view to the prevention of crippling. This includes, in most areas, hospital treatment and the provision of orthopædic clinics where treatment is given by massage, electrical treatment, and remedial exercise.

Most school medical authorities also provide special clinics for rheumatism. All cases of rheumatism, chorea, and rheumatic carditis are kept under close supervision, and, where necessary, hospital treatment is arranged.

Though the above is a broad outline of the duties of a school medical department, it carries out many other functions of a preventive character. For example, questions of school lighting and ventilation are considered, open-air schools are provided for the debilitated, and sight-saving classes for myopes and others who are partially blind. There is also a highly developed system of physical training. Necessitous school-children receive free meals in school and there are many voluntary milk clubs. There is also medical inspection in secondary schools. There can be no doubt that the school medical service is a most potent agency for improving the national physique.

Control of Tuberculosis and Venereal Diseases

Prior to the introduction of the National Health Insurance scheme in 1911 the efforts of public health authorities to deal with *tuberculosis* had been confined to notification in a few areas and to the provision of a few beds. There were, however, many cases of tuberculosis in the poor-law hospitals or in the sick wards of the workhouses. It was recognised that tuberculosis would be a serious drain on the finances of any insurance scheme which provided payment during incapacity for work and a special benefit called "sanatorium" benefit was provided in the Act. A committee was appointed under the chairmanship of the present Lord Astor to advise the government on what measures should be taken to combat this disease.

This committee recommended that an organisation should be set up which would deal with all cases of tuberculosis independently of whether they were insured under the National Health Insurance scheme or not, though, in fact, the arrangements for the treatment of the insured in sanatoria and tuberculosis hospitals remained under the Insurance Committees until 1921. To put it in the words of the committee, the scheme is intended—

> "to complete existing public health administration in respect of tuberculosis, and is based on the establishment and equipment of two units related to the general public health and medical work carried on by the medical officers of health . . . and working in harmony with the general practitioner. The first unit consists of the tuberculosis dispensary. . . . The second unit consists of the sanatoria, hospitals, &c., in which institutional treatment is given. . . . The committee are of opinion that the tuberculosis dispensary should be the common centre for the diagnosis and for the organisation of treatment of tuberculosis in each area, at which the various bodies and persons connected with the campaign against tuberculosis will be brought together. The aim should be that no single case of tuberculosis should remain uncared for in the community, and that whatever services the scheme provides should be available for all cases of the disease. Next to the tuberculosis dispensary should stand the second unit, consisting of a system of sanatoria, hospitals, farm colonies, open-air schools, &c. The tuberculosis dispensary should be linked up to these institutions, for which it will act as a clearing-house."

The dispensary acts as a receiving station and centre of diagnosis and a clearing station and centre of observation. It is also the place at or from which contacts are examined and the centre for after-care. The dispensaries fulfil a most useful function, and in some areas as many as 80 per cent. of the notified cases of tuberculosis are diagnosed at the dispensaries before the notification is sent in, as most suspected cases are sent there by their private or panel practitioners; other cases are discovered as a result of the examination of contacts by the tuberculosis officer.

The total number of beds in sanatoria and hospitals now provided by local authorities or paid for by them in voluntary sanatoria or hospitals is 26,373. At tuberculosis dispensaries 143,531 new cases were examined in 1932, including 48,531 contacts, and the total attendances were 782,602.

The authorities which administer the anti-tuberculosis scheme, as also the venereal diseases scheme, are the county councils and the county borough councils.

Mention may be made here of *bovine tuberculosis* which, it is estimated, causes 2000 human deaths a year. Tuberculosis is very prevalent amongst the cows of this country and some 10 per cent. of the churns of milk arriving in our great cities contain living tubercle bacilli, though much of it is heat-treated before sale to the public. When an urban medical officer of health has ascertained by the biological test that milk is tuberculous, he notifies the medical officer of health of the county of production. The latter then sends a veterinary inspector to examine the herd, and he has power to order the slaughter of any tuberculous animal he may discover. The farmer receives compensation for the loss of his cow.

The Tuberculosis Order requires a farmer to notify the local authority under the Contagious Diseases of Animals Acts when he suspects that one of his cows is tuberculous, and it is an offence for him to sell milk which he knows to be tuberculous.

The *venereal diseases scheme* was inaugurated in 1917 and followed the recommendations of the Royal Commission which had reported in the previous year. The war had brought into prominence the importance of taking every possible step to combat the ravages of these diseases and urgent action was essential. The essence of the scheme is the provision of clinics at which free treatment is given under confidential conditions to all who apply. At first the clinics were all at voluntary hospitals, but during recent years a number of ad-hoc clinics in separate buildings have been provided by certain local authorities and they have been very largely attended. The total number of clinics in England and Wales is now 177, and in 1932 50,824 new cases of venereal disease were treated, 31,125 cases of non-venereal disease came for examination, and the total attendances numbered 2,984,270.

Under this scheme in-patient treatment is provided where necessary and pathological examinations are made, free of charge, of specimens sent by private practitioners. Approved private practitioners—that is, those who have had special experience in intravenous medication—are also supplied free of charge with arsenobenzol preparations for use in the treatment of their private patients.

National Health Insurance Scheme

The preamble to the National Health Insurance Act of 1911 states it is "an Act to provide for insurance against loss of health and for the prevention and cure of sickness," &c.

There are many who think that its use as an instrument for the prevention of disease has not been great; but a system of capitation payment for medical attendance should, in theory at all events, have been the very greatest incentive to the practice of preventive medicine on a broad scale. There are 16,010,000 insured persons in England and Wales and some 16,780 practitioners engaged in health insurance work, and the day by day inculcation into their patients individually, wherever this is appropriate, of what they should do to prevent a return of the illness for which they have consulted their doctor should be of inestimable value in the promotion of public health. Certain panel practitioners have held meetings in halls hired by the Insurance Committee to which all their panel patients have been invited, and have addressed them on the subject of the prevention of ill-health. The local administration of the National Health Insurance Acts is in the hands of the Insurance Committees, which include in their membership representatives of approved societies, the insured persons, the doctors, and the county or county borough council as the case may be. Each county and county borough has its own insurance committee.

Control of Industrial Diseases

Beyond the inspection of workshops and workplaces by officers of the local sanitary authority, the "public agency" for dealing with the hygiene of factories and the control of industrial diseases is the Home Office, which acts through factory inspectors, factory surgeons, and a central medical staff. Factory surgeons examine juveniles on their entrance to factory life and reject them if they are unfit. It sometimes happens that dental or other treatment has been persistently refused while a boy is at school, but as soon as the parents learn that the factory surgeon will not pass him until the treatment is obtained, steps are at once taken to get it.

Cases of anthrax, lead, phosphorus, arsenical or mercurial poisoning and other industrial diseases coming to the notice of a practitioner must be notified to the chief inspector of factories at the Home Office.

General Hospital Provision

It is now an important part of the work of the county and county borough councils to administer the medical services of the former poor-law guardians. These include the management of hospitals and of sick beds in poor-law institutions and the control of the district medical service. Up to now their outlook has been largely confined to the curative side, but there is much scope for the exercise of preventive work which no doubt will be developed now that they are under the control of the large public health authorities.

In this connexion it must be remembered that the cure of a lesser ailment, which would otherwise develop into a major or even fatal one, is an important function of preventive medicine. The efficient treatment of fractures and other orthopædic conditions so that the patient can be returned to industry is essentially practical preventive medicine.

Mental Ill-health

Until comparatively recently mental hospitals were called "asylums" and their main function was the incarceration of those from whom the community needed protection. The cure and reinstatement in the community of those suffering from mental breakdown is attracting more and more attention. Recently the prevention of mental breakdown has occupied the attention of statesmen and others, and under the Mental Treatment Act, 1930, the counties and county boroughs are empowered to establish out-patient centres where patients suffering from mental illness may receive appropriate advice in the hope that a complete mental breakdown may be avoided. Provision is also made for in-patient treatment for a period without the need for certification as a lunatic. With regard to children, child guidance clinics are being established to give advice concerning maladjustment.

Prevention of Blindness

During recent years there has been a considerable reduction in the number of blind children. This is mainly due to the efforts which have been made by the maternity and child welfare authorities to prevent blindness resulting from ophthalmia neonatorum.

Under the Public Health Act, 1925, county and county borough councils are authorised to make such arrangements as they think desirable for assisting in the prevention of blindness, and some have established clinics for the purpose of advising persons who are blind or nearly blind as to what can be done to restore their sight.

Medical Research

The propelling force in advances in preventive, as in curative medicine, is research. The Local Government Board had a small sum available for research, but it was not until 1912 that a definite public agency charged with the duty of medical research was established. Its inauguration followed a provision in the National Health Insurance Act, 1911, to the effect that one penny per annum for every insured person was to be devoted to medical research. As a result of this the Medical Research Committee, now the Medical Research Council, came into being and the funds placed at its disposal by Parliament are now £139,000 a year.

Education of the Public

It will have been gathered from the above that public agencies for the prevention of disease have been generously provided. Some, like the improvement of environmental conditions, operate on all alike, though an appreciation by the public of their purpose would make them even more effective. For example, building by-laws require facilities to be provided for ventilation, yet the ignorant can render the by-law nugatory by stopping up the fireplace or the ventilator if they do not realise the importance of ventilation.

But many of the public agencies mentioned above cannot come into operation until the persons for whom they are provided apply for their assistance. For example, the tuberculosis dispensary organisation is useless if a tuberculous patient plies himself with patent cough medicines for months and only goes to his doctor or to the dispensary when the disease is already advanced. Again, the provision of hospital accommodation for measles is useless if the public regard measles as a trivial disease, wilfully expose their children to it so as to "get it over," and seek no medical advice until the patient is moribund.

Preventive medicine is only successful when it is in step with public opinion; but when public opinion is ready to accept a state or municipal service it should be there ready to hand. For these and other reasons representatives of the Society of Medical Officers of Health waited upon Mr. Neville Chamberlain, then Minister of Health, in 1924, and urged upon him the desirability of authorising health authorities to undertake educational work in their area by arranging for information to be supplied on questions relating to health or disease and for the delivery of lectures and the display of pictures in which such questions are dealt with. He acceded to this request and the necessary legislation for the provinces was included in the Public Health Act of 1925. Similar powers were given to London in the following year. This power, if properly used, should be of considerable value in promoting the public health. There is much knowledge with regard to healthy living which the public are anxious to learn. They read with avidity the advertisements of the vendors of patent medicines. It has been shown by the attendances at health exhibitions, health lectures, and at exhibitions of cinema films on health subjects that they are equally anxious to learn all that a local health authority is prepared to teach them, provided, of course, that it is put in an attractive way.

Conclusion

The above is a very brief outline of the work of public agencies for the prevention of disease. The tendency is for them to grow still further; but for even the present agencies to be fully effective the increasing coöperation of the public is essential. Progress in some directions, for example dental hygiene, is slow, but it is nevertheless sure. There is now a large cohort of persons, backed by all the power of the State, directly concerned in the prevention of disease. The results, though not uniformly successful, have been remarkable, and there is no doubt that as time goes on preventable illness and premature deaths will still further diminish.

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Principal Medical Officer, Public Health Department,
London County Council.[1]

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

Surg. Lt. J. C. Gent is promoted to the rank of Surg. Lt.-Comdr.

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Lt.-Comdr. T. C. Stevenson to *Effingham*.

Surg.-Lts. G. C. Martin and S. G. Suggit to *Rodney*; W. M. MacGregor and G. F. Jones to *Malaya*; G. H. C. R. Critien to *Excellent*, and J. O. Clyde to *Effingham*.

Proby. Surg. Sub-Lt. R. J. Carr to be Surg. Sub-Lt.

The following appts. are notified: Surg. Comdr. T. W. Drummond to *Malaya*; Surg. Lt.-Comdr. A. H. Shellswell to *Effingham*.

ROYAL ARMY MEDICAL CORPS

Lt.-Col. A. S. Littlejohns retires on retd. pay.

Maj. R. W. Vint to be Lt.-Col.

The undermentioned Capts. to be Majs. (tempy. commns.): J. M. Pinkerton, J. B. Woodrow, J. D. C. Swan, and W. Parsons.

Lts. to be Capts.: J. R. Tobin, J. E. Moody, S. Griffin, D. K. Weston, and J. Davidson.

TERRITORIAL ARMY

Maj. W. W. MacNaught (Maj. Res. of Off.) resigns his commn. in the T.A.

Maj. W. McK. H. McCullagh to be Lt.-Col. and to comd. the 13th (4th Lond.) Gen. Hosp.

Maj. F. G. Widgery from 66th (S. Midland) Fd. Bde., R.A., to be Maj. with pay and allowances of a Capt.

E. A. Cormack, late Cadet Serjt., Edinburgh Univ. Contgt., Sen. Div., O.T.C., to be Lt.

INDIAN MEDICAL SERVICE

The prob. appts. of the undermentioned officers are confirmed: W. J. Moody, A. E. Kingston, B. A. Porritt, J. M. Sclater, J. D. Murdoch, C. F. Garfit, D. K. L. Lindsay, D. R. Tweedie, A. T. Andreasen, W. S. Morgan, M. S. Purvis, M. E. Kirwan, G. S. N. Hughes, J. W. Richmond, and A. D. Barber.

The undermentioned officers retire: Lt.-Col. (Bt. Col.) J. McPherson and Lt.-Col. V. N. Whitamore.

ROYAL AIR FORCE

Flight-Lt. E. A. Gudgeon is transferred to the Reserve, Class D.

RESERVE OF AIR FORCE OFFICERS

Flight-Lt. W. Heron relinquishes his commission on completion of service.

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[1] In order to comply with the Council's Standing Orders it is necessary to state that the London County Council accept no responsibility for the author's opinions or conclusions.

SPECIAL ARTICLES

GENERAL MEDICAL COUNCIL

SUMMER SESSION, MAY 29TH–JUNE 2ND, 1934

The Pharmacopœia

Sir Henry Dale, introducing the report of the Pharmacopœia Committee, stated that 1407 copies of the British Pharmacopœia 1932, had been sold since November, bringing the total number of copies sold to date to 34,502. The Committee had received a second report from the Pharmacopœia Commission 1933–36, reporting that good progress had been made with the Addendum to the British Pharmacopœia 1932, which it was proposed to issue towards the end of 1936. This intermediate Addendum, said Sir Henry, was a new policy and would provide not only a convenient half-way stage between one Pharmacopœia and the next but also an opportunity to make such additions and adjustments as might be desirable in order to secure uniformity with the 11th United States Pharmacopœia which would be published in 1935. Active work was being carried on in the laboratory which the Council had provided, not only in preparation for the Addendum but also in dealing with the many helpful comments and criticisms which had been proferred on the 1932 issue. The Commission had given careful consideration to the newer remedies which were coming into general use, and monographs on a number of new chemical substances and preparations were under consideration by the Committee. It is obvious that every issue must contain as complete accounts as possible of vitamins and antitoxins, sera, and other animal products. Another problem before the Committee was the very large number of remedies which are virtually monopolies and which are continually taking their place in the practitioner's armamentarium. A recent meeting of the Committee had considered whether such substances ought or ought not to be included in the Pharmacopœia or in a companion volume, and a subcommittee had been appointed to discuss the matter. The adoption of the report was seconded by Dr. J. W. Bone and was carried unanimously.

Medical Education and Examination

The Examination Committee presented a report on the pre-registration examination and length of the curriculum, and on the English examination reports and visitations. The Education Committee also had two reports, one on the curriculum and the other on various matters referred to it. Prof. J. B. Leathes, introducing this report, pointed out the valuable data which were embodied in the tables showing the requirements of the licensing bodies in regard to the medical curriculum. These had been set forth in three groups: those licensing bodies requiring at least 5 years; those requiring more than 5 years; and the London schools. Three years for clinical study were now required by all the licensing bodies, and the scheme of a pre-registration examination in chemistry and physics had been followed by most of the bodies, particularly those who did not teach. The bodies which provided instruction, however, were less willing to relinquish the teaching of physics and chemistry to secondary schools and retained control of these subjects to some extent. The result had been an increase in the minimum duration of the curriculum, but at the same time the scientific foundations of medical education had become more secure, though possibly at some sacrifice to school training in Letters.

Another point on which the Council had laid much stress was the abolition of any separation between clinical and pre-clinical study. Courses in applied anatomy were now given in almost all schools, and courses in applied physiology also, though not so consistently. It was the experience of a number of teachers that students were far more eager to learn these subjects during their clinical years, when they were in a position to appreciate the value of them. Courses in radiology were given in most places in the final year, though some teaching bodies did not require special evidence of instruction, as the use of radiograms was so universal in medicine and surgery that examination in these subjects would reveal the ability of a student to interpret X ray findings.

"EVIDENCE OF GENERAL KNOWLEDGE"

The attention of the Committee had been drawn, said Prof. Leathes, to the fact that religious knowledge, though recognised by many university and licensing bodies as a subject of general education, was not so recognised by the Council. The Committee recommended that no action be taken in this matter.

Prof. Langdon Brown protested at this decision; he thought it was a great pity that it should go out from the Council that knowledge of Biblical history was not regarded as evidence of general knowledge. The University of Cambridge, he said, had drawn his attention to the matter and he asked on what grounds the Committee had come to this decision.

The Conjoint Examining Board, Prof. Leathes added, had addressed the Committee in November, 1933, drawing their attention to the variation in the scope and standard required in the London Matriculation, Oxford and Cambridge School Certificate, and College of Preceptors' Senior Certificate (Credit Standard) Examinations. The Examining Board thought it desirable that the whole of the preliminary examination should be passed on one occasion, and that it should consist of English, another language, any three of the following subjects, provided that one were taken from each section: (1) arithmetic, algebra, geometry; (2) zoology, chemistry, physics, and one of the following subjects: Latin, Greek, French, Spanish, Italian, history, and geography. They therefore thought it desirable that the present credit standard of the College of Preceptors be abolished and that an ordinary Senior Certificate of the College be accepted, provided that it was specially endorsed to show an aggregate of not less than 40 per cent. with a standard of not less than 30 per cent. in any subject. The Education Committee of the General Medical Council had agreed that these proposals would provide a preliminary examination that would be satisfactory evidence of general education.

Sir Henry Brackenbury dissented from this conclusion of the Committee. He would be willing to accept the words "A less unsatisfactory evidence," but he could not regard any preliminary examination in which mathematics was not essential as satisfactory evidence of fitness for medical study. He asked how it was possible for anyone to pursue scientific medical studies to the degree necessary for the public protection without, for instance, any knowledge of algebra.

Mr. Bishop Harman agreed, and pointed out that even the Examining Board had only used the expression, "More satisfactory evidence."

Dr. Letheby Tidy pointed out that a number of the licensing bodies did not require mathematics for amination for their matriculation, and named the niversities of Oxford, Cambridge. Manchester, iverpool. Sheffield. Birmingham, and Bristol. It uld not logically be said, he argued, that the eneral Medical Council considered mathematics ecessary if it accepted the examinations of these odies. Moreover, mathematics was often a matter very great difficulty to certain individuals, dividuals who did not necessarily make bad doctors.

Prof. J. S. B. Stopford said that there was a isunderstanding : the University might not demand athematics for its entrance, but there were faculty equirements over and above those of the University s a whole. In Manchester English, Latin, and athematics were always compulsory for the faculty f medicine.

Prof. E. Fawcett said that Bristol from the start ad demanded mathematics up to matriculation tandard for entry to the faculty of medicine though ot to the faculty of arts.

Mr. R. J. Johnstone suggested that the Report be mended to read "more satisfactory," and Prof. eathes accepted this suggestion, remarking; however, that the indirect attack on mathematics through physics might be just as good an education as the irect attack which some people found very difficult.

TUBERCULOSIS

The Education Committee had suggested in May, 1933, that they should inquire of the Licensing Bodies if they were satisfied that candidates had sufficient opportunity for studying the early stages of tuberculosis. All the licensing bodies had now replied that they were satisfied, with the exception of Birmingham and Cambridge.

Prof. Langdon Brown pointed out that at Cambridge candidates had not been taught that part of the subject within the bounds of the University, and the examiners had noticed a great variation among different candidates as to the knowledge of physical signs. They had correlated this with the varying opportunities given to the men to attend tuberculosis departments and institutions.

Sir George Newman remarked how satisfactory it was to get such a reply, as there had been widespread criticism throughout the country of the inability of medical schools to teach either maternity or tuberculosis. It was most gratifying to learn that there was in fact no difficulty, with the exception of Birmingham. He wondered what was the unique trouble of this university.

Prof. Gamgee said that the Report from Birmingham had given a wholly incorrect impression. There were plenty of cases in the out-patient department for the teaching of early tuberculosis and he would ask the University to send a supplementary report.

New Penal Cases—(*Concluded*)

ALLEGED FALSE REPRESENTATION OF FEES

The Case of Anczel Freitag, registered as of 27, Selhurst-road, South Norwood, S.E.25, L.M.S.S.A. Lond. 1929, who had been summoned to appear before the Council on the following charge :—

"That being a registered medical practitioner, you on Dec. 21st, 1932, in reply to an inquiry by the County Borough of Croydon Insurance Committee, did falsely represent to such committee that you had been paid the several sums by the several patients as set out : Edith Goldsmith, 3*s.* 6*d.*; Albert Moon, 3*s.* 6*d.*; Nellie Moon, 7*s.* 6*d.*; Jessie Plackett, 2*s.* 6*d.*; whereas in fact you had been paid the several sums by the several patients as set out : Edith Goldsmith, £1 11*s.* 6*d.* (being nine visits at 3*s.* 6*d.* each); Albert Moon, £17 6*s.* 6*d.*; Nellie Moon, 10*s.* 6*d.*; Jessie Plackett, 7*s.* 6*d.* Such representation was made by you improperly and fraudulently with the intent and for the purpose that the said committee when making the adjustment of payments due to you for your remuneration in respect of the treatment of insured persons under the National Health Insurance Acts should only deduct the several amounts set out by you in your letter of Dec. 21st, 1932. And that in relation thereto you have been guilty of infamous conduct in a professional respect."

The case was reported to the Council by the Minister of Health.

Mr. Hempson, solicitor to the Medical Defence Union, accompanied Dr. Freitag.

Mr. Hempson objected to the consideration of this matter by the Council at all, as the offence was a crime and a man accused of a criminal offence was entitled to be tried by jury under the rigid procedure of the courts. He suggested that the charge was an abuse of the Council's process by the Ministry of Health, which had its own appropriate remedy by inquiry.

Mr. Harper argued that the jurisdiction of the Council was to deal with the Register regardless of what happened outside.

The Council deliberated on the submission in camera and over-ruled it. Mr. Harper then addressed the Council.

Mr. Albert Moon, who is blind and partially paralysed, gave evidence; Mr. Harper read his statutory declaration and Mr. Hempson cross-examined him as to his attendances. He had paid respondent at each attendance; he had never had a receipt, nor had respondent made any record. He denied that the dispenser had told him the apparatus was out of order in December, 1932. His recollections were very hazy, he said. He had received a cheque for £17 odd from the Insurance Committee in repayment of fees.

Mrs. Moon gave confirmatory evidence.

Mr. Hempson objected to the admission of statutory declarations from persons not called as witnesses, and was over-ruled. Mr. Harper read a declaration from Edith Goldsmith, but was not allowed to put in evidence the finding of the Insurance Committee. The Minister, he said, had ordered respondent to refund sums to patients and had fined him £15.

Dr. Freitag gave evidence on his own behalf, agreeing that Moon and Goldsmith had been panel patients to whom he had given electrical treatment. He had sent in forms G.P. 45 in respect of them in 1931, showing that he was charging them fees for specialist services as set forth in the regulations. In 1929 he had made a similar claim, and simple sunlight treatment had been regarded by the committee as of specialist character. Not till 13 months after the forms had been sent in had he received the decision of the committee. He had given diathermy and faradism; and he produced his appointment books to show that only 47 treatments had been given. The battery of the faradic apparatus had run out in December, 1932, and had never been renewed, as the patient was not benefiting. Moon had paid 3*s.* 6*d.* on the first occasion, but no more. He produced his cash book in which he recorded all fees paid. He had been satisfied that the treatment was outside the panel service, on account of the 1929 decision. Mrs. Goldsmith had had diathermy and sinusoidal current and had paid 3*s.* 6*d.* the first time only; subsequently the dispenser had given the treatment. The visits were recorded in the appointment book. At the Insurance subcommittee there was no legal guidance as to rules of evidence and procedure, and accused was not represented by a lawyer. No inquiry at all had been held by the Ministry.

Mr. Harper read the finding of the Insurance Subcommittee to respondent, who recognised it. In reply to the Legal Assessor, he said he had produced his books to the subcommittee; he kept them himself, except for an occasional audit. He had not charged either patient after the first treatment because he had not given personal supervision.

Dr. E. W. Bone asked what the responsible body, the Croydon Insurance Committee, had done on receiving the report of its subcommittee, as this had not been stated. Dr. Freitag replied that they had accepted the report, and Mr. Hempson read the recommendation that respondent be severely censured and that the Ministry should be advised to withhold an appreciable sum from his remuneration. In reply to Sir Robert Bolam, Dr. Freitag said he knew he had a right to appeal but had not appealed because he had been working for his D.M.R.E. and had no time to spare.

Miss E. Pettitt, Dr. Freitag's dispenser, confirmed Dr. Freitag's account of the failure of the apparatus early in December and of the administration by her of treatment to Mrs. Goldsmith, who had never paid witness anything at all and had not seen the doctor privately so as to have an opportunity to pay a fee without witness's knowledge. In reply to Mr. Harper she said she had not given evidence before the subcommittee.

Mr. Hempson addressed the Council, repeating that this inquiry, if not an abuse of the Council's procedure, was at least a matter requiring careful consideration in the interests of the whole profession. Mr. Harper also addressed the Council, which did not find the facts proved to its satisfaction and therefore dismissed the case.

POLICE-COURT AND ASSIZE-COURT CONVICTIONS

The Case of William Graham, registered as of Bridge House, Manor-road, Tynemouth, M.B., B.S. 1923, U.Durh., who had been summoned to appear before the Council on the following charge :—

> "That you were at the Newcastle Assizes commencing on Oct. 30th, 1933, convicted of unlawfully killing one William Wood Walton and were fined £100 and ordered to pay the costs of the prosecution."

There was no complainant in this case.

Mr. Graham appeared, accompanied by Mr. Hempson, solicitor.

Mr. Harper, solicitor to the Council, explained that respondent had lost proper control of his motor-car due to sleepiness, and had overtaken a couple of pedestrians on the wrong side of the road and killed one of them. He had shortly before the accident discovered that he was driving on the wrong side of the road at 40 m.p.h., but had continued at that speed, thinking he had shaken off his sleep. No suggestion was made that drink was involved. Mr. Justice Humphreys, in passing sentence, had expressed the view that accused had been punished enough, and should be capable of continuing to live as a good citizen and doctor; he had not seen fit to disqualify the accused from continuing to drive. Mr. Hempson urged that nothing in Mr. Graham's conduct redounded in any way to his discredit as a medical man and a gentleman. He had been exhausted by hard work in his practice and by a number of night calls.

The Council decided not to direct the Registrar to erase Mr. Graham's name.

The Case of James Paton Neilson, registered as of 90, Liverpool-road, Southport, M.B., Ch.B. 1922, U.Glasg., who had been summoned to appear before the Council on the following charge :—

> "That you were convicted of the following misdemeanours, viz.: (1) On Dec. 9th, 1929, at Southport County Borough Police-court, of being drunk in charge of a motor-car, and were fined £15 and your licence suspended for 12 months; (2) on Nov. 21st, 1933, at the Lincoln City Police-court, of driving a motor-car whilst under the influence of drink to such an extent as to be incapable of having proper control, and were fined £50 and £3 13*s.* witness allowances, and disqualified for holding or obtaining a licence for five years."

There was no complainant in this case.

Mr. Carthew appeared on behalf of the respondent, instructed by Messrs. Le Brasseur and Oakley, solicitors to the London and Counties Medical Protection Society. Explaining that Dr. Neilson was in Canada, he read a letter from the respondent stating that he had obtained permission to practise in Canada, had started a new life in a lonely and pioneer district, and had already visited many families scattered over a vast area; he expressed deep regret for his "foolish self-indulgence" and requested the Council to accept his assurance of perpetual abstention and good behaviour in future. Mrs. Nora Neilson, respondent's wife, a medical practitioner, testified that at the time of the Lincolnshire incident respondent had been extremely anxious at the non-success of a new practice, and stated that she intended to join her husband with their children when he had established himself. Mr. Carthew read some statutory declarations testifying to the good character of the respondent. The Council decided not to erase Dr. Neilson's name.

The Case of George Francis Donaldson Perrott, registered as of 25, Bromefield, Stanmore, Middlesex, M.R.C.S. Eng. 1928, L.R.C.P. Lond. 1928, who had been summoned to appear before the Council on the following charge :—

> "That you were convicted of the following misdemeanours, viz.: (1) On April 13th, 1933, at the Staple Hill, Bristol, Police-court, of being in charge of a motor-car when under the influence of drink to such an extent as to be incapable of having proper control, and were fined £50 and £2 6*s.* costs and your licence suspended for five years; (2) on Nov. 17th, 1933, at the Marylebone Police-court, of being drunk and disorderly, and were fined 10*s.* 6*d.* or seven days' imprisonment."

There was no complainant in this case.

Dr. Perrott was accompanied by Mr. T. Carthew, counsel, instructed by Messrs. Le Brasseur and Oakley, solicitors, on behalf of the London and Counties Medical Protection Society.

Mr. Harper laid the facts before the Council and Mr. Carthew addressed it. After consideration in camera the President pointed out that the respondent had been twice previously before the Council on similar charges. On the first occasion he had promised to abstain from alcohol and had produced satisfactory testimonials at the end of a year's probation. The President continued :—

> "Being a medical council, perhaps we are more familiar than an ordinary jury with the difficulties of your case, and we have decided to take a course which we believe to be very much in your interest. We will put you on two years of probation. At the end of one year, we shall expect to have reports on your conduct from persons such as those from whom you have previously submitted testimonials. . . If there should be any further lapse on your part during that time, you will be again summoned to appear before the Council."

Penal Cases Postponed from a Previous Session

The Case of Peter John Gormley (formerly Grimes), registered as of 167, Wigan-road, Ashton-in-Makerfield, Lancs, M.B., B.Ch. 1919, N.U. Irel., who had appeared before the Council at its summer session, 1933, on the charge of having been convicted on two occasions of driving a motor-car whilst under the influence of drink, and of other motoring offences. The Council at that session had postponed judgment for a year subject to the usual proviso that the respondent should within that time give the names of a number of his professional brethren from whom the Council could request a report on his character and conduct in the interval. Mr. Gormley now appeared, and Mr. Harper read a number of letters which showed that his behaviour had been satisfactory in every respect. The Council did not see fit to direct the erasure of his name.

The Case of Victor Cecil Tughan, registered as of 4, Stanton-court, Greenhill, Weymouth, M.R.C.S. Eng. 1925, L.R.C.P. Lond. 1925, who appeared before the Council charged with having been convicted on two occasions of driving a motor-car whilst under the influence of drink. Mr. Tughan should have appeared at the last winter session, but the hearing was adjourned because of his illness. After hearing the Council's solicitor and Mr. Tughan, the Council postponed judgment for six months subject to the usual provisos.

Penal Cases Reported by the Dental Board

In accordance with custom, the Council heard penal cases in public and deliberated on its findings in camera.

The Case of John Holden Beckett, registered as of 10, St. Peter's-road, Leicester, L.D.S. R.C.S. Eng. Mr. Beckett was not present, nor was he represented. He had been twice convicted of travelling on the railway without having paid the fare and with intent to avoid payment thereof. The Dental Board had found the charges proved and had required testimonials, all of which had proved unfavourable or inadequate. The Board had therefore found that his name ought to be erased from the Register. Mr. Harper, the solicitor to the Dental Board, gave the Council some details of the case, and after deliberation in camera the President announced that the Registrar had been directed to erase Mr. Beckett's name from the Dental Register.

The Case of Nathan Moss, registered as of 29, Shoot-up-hill, Cricklewood, London, N.W.2, dentist 1921, who had been found guilty by the Dental Board of advertising for the purpose of promoting his own professional advantage by the issue of circulars, 10,000 of which had been printed and circulated by an addressing firm. He had been warned by the Registrar previously. Mr. Moss appeared, accompanied by Mr. Scott Henderson, counsel, instructed by Messrs. Bulcraig and Davis, solicitors. The Registrar read the report of the Dental Board. Mr. Henderson addressed the Council on Mr. Moss's behalf. He expressed his client's regret, and criticised certain proceedings before the Dental Board and the wording of the charge. He adduced evidence that certain persons there mentioned had been in fact patients of Mr. Moss; and declared that the Dental Board had appeared to accept this evidence. He argued that non-attendance for two or three years could not make a patient a patient no longer.

Mr. Harper addressed the Council and admitted that the circular alleged to have been addressed to Mr. Alfred Smith, one of the persons whose evidence had been heard by the Dental Board, was addressed to "Mr. S. Smith" and might reasonably be supposed to have been intended for Mrs. Sophia Smith, the wife, who was in fact a patient of the practice.

The President, after deliberation in camera, announced that the Council did not see fit to direct the Registrar to erase Mr. Moss's name.

The Case of Lawrence Louis Symmonds, registered as of 58, High-street, Bargoed, Glam., L.D.S. R.C.S. Eng., who had been summoned before the Dental Board on a charge of setting up a dental clinic, with reduced fees, where only himself and his assistants were allowed to treat patients. The conditions of attendance were set forth in a circular which he had handed and sent to various medical practitioners in the attempt to obtain patients. The Dental Board had found him guilty of advertising to attract practice and had recommended the erasure of his name.

Mr. Symmonds appeared in answer to his notice, accompanied by Mr. T. Carthew, counsel, instructed by Messrs. Le Brasseur and Oakley, solicitors, acting on behalf of the London and Counties Medical Protection Society. The Registrar read the notice and Mr. Carthew addressed the Council, saying that Mr. Symmonds had been a "Dentist 1921" before qualifying L.D.S., and had for years had the largest practice in the district. With one exception, he and his assistants had been the only dental surgeons in the neighbourhood; nor were there any other dental clinics. The area was a very poor one, and people could not afford to travel to Cardiff or Newport. Mr. Symmonds had taken responsible advice before opening his clinic, and had written to all the doctors in the neighbourhood asking for an interview, in order to obtain their views. They had all said that some such scheme was badly wanted.

There was no suggestion that the respondent had approached any but doctors; and he had offered to explain the scheme to the Rhondda Valley Medical Association. The scale of fees was not one which offered any profit, and he had refused to do the work for any patient who had not a certificate of poverty from a doctor.

Mr. Harper addressed the Council, and said that other dentists in the district ought, in the opinion of the Dental Board, to have been brought in; even if "only Dentists 1921" they were all dentists. He read certain question and answers from the report of the inquiry before the Board. He argued that the scheme had not been a charitable one, but an attempt to increase respondent's own practice.

The Council decided not to erase the respondent's name from the Register.

LISTER INSTITUTE OF PREVENTIVE MEDICINE

THE 40th annual report of the governing body records the research work in progress in the various departments. We select below from the mass of interesting material notes on a few of the investigations being carried out in the department of bacteriology, serology, and experimental pathology.

Studies on Viruses

Vaccinia.—Continuing his studies on the cultivation of vaccinia virus on cell-free fluid media, Dr. G. H. Eagles has completed a series of passages in which the washed elementary bodies obtained from deposits of

Berkefeld V. filtrates of dermal virus centrifugalised at high speed were used for the initial seeding. "Kidney extract," prepared by grinding, salting, and high-speed centrifugalisation, constituted the culture medium. Seven generations of subculture have been carried through without apparent loss of potency, the final subculture representing a multiplication of 20^7 times the original potency of the seeding as judged by animal titrations.

As in previous series, considerable irregularity was experienced among individual flasks set up at the same time. The few workers in other countries who have attempted the cultivation of vaccinia in cell-free media have not succeeded in securing definite evidence of growth, and in the attempt to reconcile such conflicting results, Dr. Eagles is now, in conjunction with Dr. A. B. Sabin (Fellow, National Research Council, U.S.A.), undertaking a fresh series of experiments and certain possible sources of error are being investigated.

The use of *elementary body suspensions for vaccination against small-pox* is being investigated. These suspensions, derived from filtrates of dermal virus by high-speed centrifugalisation, possess high activity and can be prepared with ease and economy. As they represent the virus in the purest form and are bacteriologically sterile, an investigation is being made of their activity under various conditions of storage.

Dr. C. R. Amies has found that such suspensions, in a medium of simple broth, retain their activity for considerable periods when kept at room temperature and, indeed, for several weeks, at 37°, the survival periods comparing very favourably with those obtained with crude pulp in saline or glycerol saline. At 0° C. the loss of activity is, as might be expected, small.

Dr. Amies has not been able to confirm the claim recently made by Russian workers that vaccinia virus can be readily cultivated in vitro in symbiosis with yeasts.

Dr. M. H. Finkelstein, using a modification of the complement-fixation technique introduced by Mackie and Finkelstein in 1928, has shown that no fixation takes place with hyperimmune sera and material from vaccinia if the elementary bodies are absent.

Varicella and herpes zoster.—Dr. Amies, following up his previous work on varicella, has fully confirmed the finding of elementary bodies in herpes zoster and has obtained pure suspensions of them by high-speed centrifugalisation of the vesicle fluid. Agglutination tests lend further support to the belief that the two viruses are closely related, if not identical. The relationship of fowl-pox to pigeon-pox is being studied by Dr. Finkelstein and the properties of louping-ill virus grown in vitro by Mr. D. W. Henderson.

A virus recovered by Dr. Sabin from a human case of acute ascending myelitis, associated with focal necroses in viscera ("B" virus), has been found to be readily communicable to rabbits, in which an ascending paralysis leading to fatal issue regularly followed an intradermal injection after an interval of some days. These animals, like the original human case, presented necrotic foci in certain viscera similar to those associated with highly virulent vaccinia and herpes infections. The further investigation of this virus from the point of view of possible relationship to the herpetic group of viruses is being actively pursued by Dr. Sabin.

Spore-bearing anaerobes.—Work commenced last year on the antibacterial mechanisms associated with *C. tetani* prophylaxis has been continued.

Experiments on the efficacy of high titre antitoxic sera in protection against *C. tetani* spore infection have shown that such sera only delay the onset of the disease, which later ends fatally. A successful issue may, however, be obtained by repeated intravenous inoculation of antitoxin until the local lesion produced by the activator is no longer effective in maintaining conditions suitable for the reproduction of the organism and the associated toxin production. The survival of spores in such recovered animals is being investigated.

Studies on virulence.—Dr. A. Felix, in collaboration with Miss R. M. Pitt, has studied the relationship between virulence and susceptibility to the action of the "O" antibody working with *B. typhosus*. In experiments with mice it has now been found that highly agglutinable strains of *B. typhosus* are of low virulence, while inagglutinable strains are highly virulent. Both types of strain were carefully tested by all the known methods for detecting "roughness," and were found to be perfectly smooth. There was also no difference in their content of "H" antigen.

The inagglutinability of these strains is strictly a property of the living organisms. The nature of the factor underlying the phenomenon is as yet entirely obscure. The results do not contradict the view that rough forms are non-virulent, but they do indicate that the mere presence of smooth "O" antigen does not completely define virulence. Some obscure property is required to render this antigen resistant to "O" antibody.

RESISTANCE TO INFECTION AND GENETIC CONSTITUTION

Through the kindness of Dr. L. T. Webster, of the Rockefeller Institute, and Prof. J. B. S. Haldane, of University College, selected and pure line races of mice have been obtained, and the breeding of them has been successful enough to permit of the testing of groups of these races for resistance to a variety of infective agents, including *S. typhi murium*, *S. enteritidis*, *M. pneumoniæ*, and the virus of louping-ill. Dr. H. L. Schütze and Dr. Finkelstein, who are conducting these experiments, have already been able to demonstrate very striking differences in the susceptibility of these strains of mice to the test infections selected, and it is hoped in this way to acquire some insight into various processes of immunity.

In the division of protozoology during the year Miss Muriel Robertson, D.Sc., has been concerned with the study of various aspects of the effect of gamma ray irradiation on the growth of *Bodo caudatus*.

(*To be concluded*)

MEDICINE AND THE LAW

Jurisdiction of the G.M.C.

OUR learned contemporary, the *Law Journal*, voices misgivings which have also been expressed elsewhere over the jurisdiction lately asserted by the General Medical Council in a case referred to it by the Minister of Health, and reported on page 1307 of our present issue. In effect, a panel practitioner was accused of a fraud amounting to a misdemeanour, and there was a question which was the proper tribunal, the G.M.C. or a court of law. The local medical service subcommittee had found that the practitioner had offended against the medical benefit regulations. The complaint against him was that he had understated to the Croydon Insurance Committee the fees paid to him by certain panel patients for special treatment. The suggestion was that he planned this alleged irregularity in order that the committee, when adjusting his remuneration, might make smaller deductions than would otherwise have been made. The Minister of Health fined him £15 on the report of the investigation and, without ordering a disciplinary inquiry under the National Health Insurance Act, sent the case to the General Medical Council. When the Council began the hearing on June 2nd, its jurisdiction was challenged on a preliminary objection on behalf of the respondent doctor. It was urged that he had a right to have this criminal charge of misdemeanour tried in a proper court of law before a jury and upon sworn evidence. The Council overruled the objection, examined the facts, and dismissed the case.

The Council has, of course, a statutory jurisdiction (under Section 29 of the Medical Act) to make due inquiry into an allegation of "infamous conduct in any professional respect," and no one will deny that an allegation of the fraudulent manipulation of accounts as to fees might come within these words in the section. But the authorities who administer the criminal law might well object to the Council assuming an original jurisdiction in every case of alleged felony and misdemeanour where the accused is a doctor. The very idea seems to recall the claim of the mediaeval Church to exercise temporal jurisdiction over its members—a claim which allowed "benefit of clergy" to furnish a simple form of clemency to first offenders. One inevitable question arises: if the Council exercises jurisdiction over the doctor in a charge of fraud, what is the effect on subsequent proceedings in a police-court or at assizes? There is an established rule of the common law that a man may not be twice put in peril for the same offence. The Council may not be within the letter of the rule as a competent tribunal whose acquittal bars any fresh indictment in the same matter. But if, in the recent case dismissed by the Council on June 2nd, fresh criminal proceedings were now instituted elsewhere, there would be a feeling that the spirit of the rule had somehow been broken.

VOLUNTARY HOSPITALS CONFERENCE

A CONFERENCE of voluntary hospitals, convened by the British Hospitals Association and the Incorporated Association of Hospital Officers, was opened on June 13th by H.R.H. The Prince of Wales. The Prince was received by the Lord Mayor, Sir Charles Collett, and Sir Arthur Stanley (President, British Hospitals' Association). After the appropriate presentations had been made, the Prince declared the conference open and a vote of thanks was proposed to him by the Lord Mayor and seconded by the Hon. Arthur Stanley. Owing to the sudden illness of Sir Ernest Morris, a paper by him on "Voluntary Hospitals, Past, Present, and Future," could not be read and the session devoted to the subject was abandoned.

At the session which immediately followed the opening ceremony the chair was taken by Lord Macmillan, chairman of the Hospital for Sick Children, Great Ormond-street, for a discussion on

The Out-patient Department

Lord MACMILLAN said that the out-patients' department presented difficult and important problems. It had two aspects: that of policy and that of method. Under policy came the great question whether the out-patients' department performed the functions it was designed to serve; whether it was attended by the right type of patient, both from the social and medical aspect; whether enough scrutiny was made of those attending; and whether the best possible use was made of the many organisations which had come into being since the hospitals were instituted. That blessed word "coördination" really did stand for something of moment. As to method, the mere mechanical handling of out-patients was difficult. Often the authorities were hampered by accommodation that had been completely outgrown; that was a problem for the architect. Then there was the question how to get patients there at the right time. He himself had an appointment with his dentist at 4 o'clock, but he was quite prepared to study antideluvian journals for some time before being admitted. If the private consultant could not keep precise appointments, what of those handling immense crowds? Waiting was no fault of the staff; none could tell how long a given case would take and no purely mechanical arrangement could be arrived at.

The Earl of ONSLOW, chairman of the Out-patient Committee of King Edward's Hospital Fund for London, opened the discussion. He said that one of the great difficulties of out-patient treatment was that of getting a true picture of the situation. There was really only one substantial complaint: overcrowding. One of its chief causes was the popularity of the hospital. Numbers of patients might just as well go elsewhere and could get the same treatment, often from the same specialists, in clinics provided by the local authorities. A certain amount of waiting was probably unavoidable, but something could be done by time-saving methods and by reducing the number of patients. No hard-and-fast rule could be laid down for every institution, but hospitals could now pool their experience, and the King's Fund had appointed a committee to this end. Undoubtedly old-fashioned and inadequate accommodation had accounted for much difficulty, and much structural alteration could be done at small cost. It was important that out-patient time-tables should be widely and accurately known, so that patients should not arrive far too early in error. Difficulties in the way of introducing an appointment system were the unpunctuality of patients, the necessity of securing a constant stream so that the consultant's time was not wasted, and the complication of unexpectedly short or long cases and the arrival of urgent cases. Moreover, a consultant who had all his patients for the afternoon before him could sift them, so that his assistants saw some while he got on with those reserved to himself and could leave as soon as he had finished. A partial appointment system, however, seemed possible; patients might be summoned in groups or classes at different hours, and appointments might be possible in special departments. Specialists should not have to do their own clerical work. As a counsel of perfection, there seemed much to be said for the British Medical Association's ideal of making the out-patient department purely consultative, but this seemed impracticable. The users of the hospital would object; they would not like asking their doctors for letters thus revealing suspicions of his treatment, and moreover many persons had no regular doctor.

IRELAND

(FROM OUR OWN CORRESPONDENT)

THE HOSPITALS SWEEPSTAKES AND MEDICAL RESEARCH

THE sweepstake on the Derby, which was drawn last week, brought a sum of £519,089 to the Hospitals Fund. The total amount which has been distributed, or is awaiting distribution, to the hospitals, as the result of the twelve sweepstakes which have been conducted, is £6,897,132. Some months ago the various hospitals which are associated in conducting the sweepstakes, agreed that they would be willing to allot a sum from the proceeds for the endowment of medical research, a method of allotment permitted by the Act of last year. A scheme has now been prepared by a representative expert committee and has been approved by the hospitals committee. The next step is to put it before the Hospitals Commission which advises the Minister as to the distribution of the Hospitals Fund. The details of the scheme are not likely to be made public until the scheme receives the approval of the Hospitals Commission, but it was stated last week that a substantial sum of money will be asked for and that the scheme will include provision for research to be carried out abroad, as well as at home, and by foreigners as well as by citizens of Ireland.

ROYAL COLLEGE OF SURGEONS IN IRELAND

The annual elections at the Royal College of Surgeons in Ireland were held on June 4th. Mr. Seton Pringle has been elected president unopposed, and Mr. Adams A. McConnell, vice-president, also unopposed. Mr. Pringle has been vice-president since 1932. He is visiting surgeon to the Royal City of Dublin Hospital and surgeon to Drumcondra Hospital; he is also honorary lecturer on the pathology of bone in the School of Physic, Trinity College. Mr. Adams McConnell is senior surgeon to the Richmond Hospital, Dublin. He has been a Fellow of the College since 1911.

HEALTH COMMITTEE OF THE LEAGUE OF NATIONS

It is announced that Dr. Denis J. Coffey has been appointed a member of the Health Committee of the League of Nations. Dr. Coffey, who is the first Irish medical man to be appointed to this committee, is president of University College, Dublin, and also president of the Irish Free State Medical Registration Council.

SCOTLAND

(FROM OUR OWN CORRESPONDENT)

WATER SHORTAGE IN SCOTLAND

EARLY in the year the Department of Health suggested that the local authorities and other water undertakers should make a survey of their position and prepare plans for effecting economies in consumption and adding to their supplies. On June 4th they issued a second circular enclosing a summary of the Water Supplies (Exceptional Shortage Orders) Act. 1934. It is not in the cities that the greatest trouble will have to be faced. In the counties, when there is little snow in the winter, the wells tend to give out and typhoid fever used to appear regularly. Now typhoid is under better control, but other indirect results may have to be faced. Many of the small burghs are not very well supplied. The tendency in Scotland is to seek out gravitation supplies, and the departmental committee now sitting on the medical services some time ago issued an interim report recommending a survey of the water-supplies. This had been also recommended by the Royal Commission on Housing in 1917; but nothing has been done. The matter is urgent now and the department will have less trouble in rousing the activities of the local authorities. Previous experience would lead one to doubt whether advice to householders is likely to have much effect, but a stringent supervision of meters for "works" and particularly of street fire hose connexions ought to result in perceptible economy.

ROYAL EDINBURGH HOSPITAL FOR SICK CHILDREN

A total of 46,878 children received treatment last year at this hospital. During 1933 3013 cases were treated in the hospital. The average daily number of patients in the hospital during 1933 was 126, and the average duration 14·7 days. The ordinary income (not including legacies or special donations) amounted to £14,308, and the ordinary expenditure to £19,351. The number of in-patients is slightly less for 1933 than for 1932; but there has been a material increase of attendances at practically every branch of the out-patient department. Since the institution of child welfare clinics, which deal admirably with the minor diseases of children in their early stages, the hospital is now concerned almost entirely with acute medical and surgical cases involving greater care and attention from the nursing staff which has had to be increased. The extension of the off-duty hours allowed to nurses and probationers has also necessitated additions to the nursing staff.

ACUTE RHEUMATISM AND SCARLET FEVER

The report of this hospital also gives some interesting figures bearing on the relation between acute rheumatism and scarlet fever. During 1933 there was a very high incidence of acute rheumatic infection; 62 children who had not previously suffered from acute rheumatism, so far as could be ascertained, were admitted to hospital during the year, and a number of old cases readmitted. Now in 1933 there occurred in Edinburgh one of the largest epidemics of scarlet fever which the city has experienced, and it is significant that, coincident with this epidemic, there should have been a marked rise in the incidence of acute rheumatic infection. There is room here for a good deal of research, in view of the evidence that all these diseases are of streptococcal origin.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED JUNE 2ND, 1934

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 2 (last week 2); scarlet fever, 2314; diphtheria, 1021; enteric fever, 21; acute pneumonia (primary or influenzal), 998; puerperal fever, 39; puerperal pyrexia, 109; cerebrospinal fever, 13; acute poliomyelitis, 8; acute polio-encephalitis, 4; encephalitis lethargica, 7; dysentery, 11: ophthalmia neonatorum, 98. No case of cholera, plague or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on June 11th–12th was as follows: Small-pox, 3 under treatment, 0 under observation (last week 5 and 0 respectively); scarlet fever, 1585; diphtheria, 1705; measles, 1890 (last week 2160); whooping-cough, 283; puerperal fever, 30 mothers (plus 6 babies); encephalitis lethargica, 269; poliomyelitis, 2; "other diseases," 153. At St. Margaret's Hospital there were 18 babies (plus 7 mothers) with ophthalmia neonatorum.

Deaths.—In 121 great towns, including London, there was no death from small-pox, 1 (0) from enteric fever, 43 (11) from measles, 11 (3) from scarlet fever, 35 (7) from whooping-cough, 28 (5) from diphtheria, 40 (11) from diarrhœa and enteritis under two years, and 48 (9) from influenza. The figures in parentheses are those for London itself.

Liverpool reported 4 fatal cases of measles; Barnsley, Gateshead, Newcastle-on-Tyne, Grimsby each 3: no other great town more than 2. Liverpool reported 6 deaths from whooping-cough, Birmingham 5.

The number of stillbirths notified during the week was 278 (corresponding to a rate of 37 per thousand total births), including 44 in London.

PUBLIC HEALTH

The L.C.C. Consultant Service

THE scheme to provide a consultant and specialist service in hospitals under the jurisdiction of the London County Council came into partial operation in July of last year and into full operation in October. The list of consultants and specialists participating in this scheme has since been published with the number of weekly sessions allocated to each ; during the last few months 197 of the 223 weekly sessions authorised have actually been held. Last Tuesday the Council reviewed the existing arrangements and decided that they do not call for radical amendment at present but should be continued at all events up to the end of the present calendar year. It is noteworthy that, although in March, 1933, scales of salaries were approved for full-time consulting physicians and surgeons, no appointment has been made of either, although two medical superintendents act as part-time specialists, as and when required, with additional remuneration. The appointment however of a full-time consulting radiologist is now being considered. The weekly sessions are shortly to be still further increased ; the authorised total of 223 sessions will apply to the group service as a whole without limitation of any particular type of consultant. Some minor readjustments are to be made. Extra remuneration is to be given for emergency visits when a consultant's total visits exceed the number for which he has been engaged ; the fee suggested is £2 12*s*. 6*d*. a visit. The same arrangement applies to part-time otologists and to thoracic surgeons, in the latter case the fee being £3 3*s*. a visit. In view of the fact that whole-time radiologists are not generally employed on Sundays, it is proposed to form a rota of consulting radiologists willing to undertake Sunday duty. The employment of refractionists to relieve the consulting ophthalmologists is contemplated when the alternative would be the employment of a new consultant for a weekly session ; the refractionist costs £95 a year for one session a week against the ophthalmologist's £125. Special anæsthetists have been called in as required at a fee of £2 2*s*. a session and this fee is now to replace the existing fee of 34*s*. for general anæsthetic purposes, which is regarded as too low. Thoracic surgeons are paid double fees for visits and consultant anæsthetists attending them are to have the same concession. At the Edmonton and Brentwood colonies need has arisen for regular supervision by a consulting neurologist, who will pay fortnightly visits to each colony at a salary of £125 a year. At the Lambeth Hospital Sir Comyns Berkeley on ceasing to be director of the X ray and radium units becomes hon. gynæcological surgeon, with an assistant employed for three sessions a week at £275 a year. For the children's hospitals at Carshalton and the Downs visits of a consulting general surgeon and consulting physician at monthly intervals are to be remunerated at £2 12*s*. 6*d*. a session. Finally the arrangement whereby the tuberculosis officers of the metropolitan boroughs are deemed to be hon. consultants for tuberculosis in the general hospitals is to be continued.

Recommendations under the Mental Treatment Act

The Board of Control has issued a list, revised up to May, 1934, of medical practitioners in England and Wales approved by the Board for the purpose of making recommendations under Section 1 (3) and 5 (3) of the Mental Treatment Act, 1930. An alphabetical list contains the names, qualifications, and addresses of about 2800 practitioners, and is followed by a local list of the cities and towns where they can be found. The new list, which takes the place of a previous list issued in October, 1932, can be obtained on application from H.M. Stationery Office or the Secretary of the Board of Control, Caxton House West, Tothill-street, London, S.W.1.

PANEL AND CONTRACT PRACTICE

Benefits for Married Women

IT is now more than a year since the sickness benefit for married women was reduced from 12*s*. to 10*s*. a week, and disablement benefit from 7*s*. 6*d*. to 5*s*. a week, and it would be instructive to compare the 1933 figures with those of 1932. In one society to whose figures the *National Insurance Gazette* has had access, claims from married women have fallen off, expenditure on them having been reduced by 34 per cent. It does not pay so many married women, the *Gazette* remarks, to claim benefit at the lower rate. Our readers will recall that before these reductions took place married women's claims were more than 100 per cent. above those expected when the actuarial calculation was made ; the reduction stated in the case of the society quoted will hardly make the financial position sound. Combined expenditure on sickness and disablement benefits of this society averaged 12*s*. per head for men, 14*s*. per head for spinsters and widows, and 22*s*. 6*d*. for married women. Since both classes of women pay the same contributions in stamps—the married women often pay for a shorter period when contributions cease after marriage —it does not seem fair division between the two classes. The married women's claims are in fact about 61 per cent. higher than those of other women. Insurance is often obtained by women after marriage for employment that is almost nominal ; they can claim insurance if they work only one day or even one hour a week. The healthy may not bother to do so, whereas those likely to be unfit insist on it with their employers. In these cases the women's earnings can only be little if at all higher than sick pay when on the funds ; they then have more time for their house duties which they are often able to do. This means that there is little inducement for the woman to declare off if she can persuade the doctor to give her a certificate. If the woman's husband is ill or unemployed she becomes the breadwinner, and as such is a genuine worker under the Act, but those who only work a few hours a week should not be considered as employed persons for the purpose of the Act. There is already a provision to exclude from insurance certain classes of work (e.g., cinematograph employees) involving less than a stipulated number of hours per week. The genuine worker, married or single, is penalised by unfair demands upon the funds. This is shown by the number of women's societies which have no funds left with which to pay ophthalmic, dental, or other additional benefit. The *Gazette* finds it definitely unjust that a minority of exorbitantly high claims by married women should deprive other insured women of benefits they might reasonably expect to enjoy.

Medical men might bear these considerations in mind when attending the casual-worker housewife for rheumatism or backache. They have a duty to their other insured patients as well as to the one who is receiving attendance and claiming benefit at the moment.

On Buying a Practice

Newly qualified practitioners often find difficulty in raising money with which to buy a partnership or a practice. To do this they are too apt to have recourse to firms who will advance the money without investigating whether the practice is good or not from the purchaser's point of view. The young practitioner may then find himself in possession of a practice in which the income does not enable him to pay off his liabilities to the lender as well as to provide him with a livelihood. We have already pointed out where this may lead.[1] The practitioner is forced to break his agreement with the moneylender, who is then in a position to intimate to the insurance committee his resignation from the panel and to nominate some other doctor to take over his patients. The situation for him is then disastrous; he has no money and someone else has his patients. Unfortunately such experiences are not uncommon, and hitherto insurance committees have not felt able to intervene. The Insurance Acts Committee has now received information from the clerks to a number of insurance committees who receive instruction from young practitioners to pay their quarterly cheques to Messrs. X Y Z. To deal with this situation it was reported at the May meeting that there is in process of completion by the Insurance Acts Committee a scheme for the advance of money to suitable applicants somewhat similar to that now working with regard to life insurance. One advantage of such a scheme would be that, as in the case of certain mutual benefit societies, the practice for which the applicant required the loan would be investigated by professional men familiar with such work, and the applicant would have the satisfaction of knowing that his practice is regarded as a bona-fide proposition. The terms of the loan too are not likely to be so onerous.

Arch Supports Again

The decision of the referees as to such supports being splints was discussed by representatives of the Insurance Acts Committee with the Ministry, when it was apparently decided to give up the attempt to define a splint. The object of a definition would of course be to make it clear what the chemist has to supply at the cost of the drug fund. In place of such a definition a list is to be drawn up of certain splints which will come within the category; those not listed will have to be obtained by the patient from a surgical instrument maker, with the help of money, if available, from additional benefit funds. From time to time no doubt additions will be made to the list; the procedure will prevent such difficulties as have arisen in the case of arch supports. Insurance practitioners not infrequently order on a prescription form appliances—e.g., a truss—which are not on the schedule of appliances which may be so ordered. When such a prescription gets to the pricing bureau the insurance committee pays the chemist who supplied the truss and recovers the money to do so from the doctor—who is apparently not permitted to reclaim from the patient. It hardly seems fair that the doctor should bear this expense when, if he had known the appliance was not in the schedule and he had ordered it on a piece of paper, the patient would have had to obtain it and pay for it in the best way he could. This matter also is to be discussed with the Ministry.

Health Insurance in America

Although the American Medical Association is still officially opposed to any form of national health insurance, the Michigan State Medical Society has had before it a recommendation to adopt the principle. The House of Delegates before accepting the recommendation sent its speaker, Dr. H. A. Luce, and Dr. Nathan Sinai, chairman of the committee on medical services, to make a study of the English system. On their report the medical profession in Michigan is now committed to the principle of health insurance provided that its administration is under the control of the medical profession.

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[1] THE LANCET, 1933, ii., 1325.

CORRESPONDENCE

THE LATE SIR WALTER FLETCHER

To the Editor of THE LANCET

SIR—The public life of this country suffered a loss of more than common magnitude through the death of Sir Walter Morley Fletcher, K.B.E., M.D., F.R.S., first Secretary of the Medical Research Council, on the 7th June, 1933. He was then in his sixtieth year, and in the height of those powers which he had used without stint in the service of science and of mankind. The ideal that he held before him, in words which were frequently upon his lips, was the advancement of knowledge for the relief of human suffering. He strove ever towards this, both in his years at Cambridge as a brilliant investigator and an influential teacher of youth, and later in the administration of the public support provided for medical research and in measures for bringing the results of scientific work more effectively to the assistance of the State.

Walter Fletcher gave richly to the common weal, and it is proper that some worthy tribute of an enduring kind should be paid to his memory. The desire to take part in this will be widespread among those who were able truly to appreciate his great labours in the cause of medical science, and will be felt not least by the many research workers who were directly indebted to him for help and inspiration: it will extend, also, to others in different spheres of life who were privileged to enjoy that friendship for which he had so great a gift, and throughout a wider circle of those who admired his vigorous personality and his mastery of practical affairs.

It is considered that the tribute should consist in the first place of a personal memorial, and secondly, of the inception of some scheme for the furtherance of the cause which Sir Walter Fletcher had so much at heart. It is therefore proposed first to commission a portrait bust, to be placed in a suitable setting in the entrance hall of the National Institute for Medical Research at Hampstead. The remainder of the sum collected will then be used as a fund for building—at the farm premises of the National Institute at Mill Hill—a Walter Fletcher Laboratory, to be devoted particularly to those nutritional studies in which he was so keenly interested. This will not only provide an appropriate memorial, but it will make an urgently needed contribution to the national equipment for work in what is at present among the most important of all branches of medical research.

In view of the wide utility and public value of the second part of the memorial, it has not been thought desirable to suggest for individual subscriptions any limit such as might have been fitting for a tribute of a purely personal character. It is strongly hoped, however, that this will in no way deter those who may wish to have a share in the personal memorial but are of necessity restricted to giving quite small sums. All subscriptions should be sent to the Secretary, Fletcher Memorial Fund, 38, Old Queen-street, Westminster, S.W.1.

We are, Sir, yours faithfully,

Stanley Baldwin
F. G. Hopkins
D'Abernon
Mildmay of Flete
C. S. Sherrington
Alan Gregg
Dawson of Penn
H. J. Waring

C. J. Martin
T. R. Elliott
Robert Muir
Harriette Chick
G. M. Trevelyan
M. R. James
A. E. Boycott
H. H. Dale
E. Mellanby.

London, June 7th.

FURUNCLE OF THE AUDITORY MEATUS

To the Editor of The Lancet

Sir,—Every nose, throat, and ear specialist has amongst his patients a number of sufferers from furunculosis of the external auditory meatus. Whilst not dangerous either to life or to hearing, the trouble assumes importance from the fact that the pain is excruciating and calls for immediate relief. My experience has led me to formulate a few "dont's":

1. Don't use hydrogen peroxide.
2. Don't use strong glycerin of carbolic drops.
3. If there is nothing to syringe out in the ear do not syringe.
4. Avoid solutions of mercurochrome.

Hydrogen peroxide does not relieve pain and its use paves the way for other furuncles to develop. Glycerin of carbolic damages healthy skin around the furuncle and renders it more liable to infection. Syringing pushes infective material further into the meatus and gives rise to a deeper and ten times more painful boil. If there is a big mass of cerumen, with or without otomycosis (a trouble very common in the tropics), then it is wise to syringe out the mass after preliminary instillation of warm phenol in paraffin (1 in 400). Mercurochrome colours everything deep red and makes the day-to-day watching of the condition difficult.

I have found the following treatment successful in about 500 cases and can thoroughly recommend it. It consists of the application of an ointment locally, followed by the putting in of drops, preceded by radiant heat.

R 1. Zinc oxid. grs. 90.
Adip. benz. ℥i.

R 2. Hydrarg. perchlor. gr. ½.
Cocain. hydrochlor. grs. 5.
Atrop. sulph. gr. ¼.
Tinct. aconit. ♏v.
Glycerin ℥i.

Take a small mustard spoon and half fill it with the ointment, heat it to boiling-point over a flame, and allow it to cool. With a suitable wooden applicator and sterile cotton-wool dab the still liquid ointment on the furuncle and the parts around until well covered by a thick layer of the ointment. If there is much swelling at the meatal entrance the liquid ointment may be poured in. After three hours apply radiant heat from a lamp at a distance of 30 in. for thirty minutes. Early in the application fill up the ear completely with the drops, leaving them in for at least three minutes. Repeat the radiant heat and drops every six hours. Give internally aspirin grs. 5–10 every four hours and an adalin tablet at bedtime repeated after five hours. After 24 hours swab out the ointment gently with phenol paraffin and re-apply.

Within four days almost all the pain and much of the swelling will have disappeared. Now change the drops to hydrarg. perchor. gr. ¼ in glycerin ℥i night and morning for a fortnight. If there is adenitis, antiphlogistine poultices will quickly bring down the inflammation.—I am, Sir, yours faithfully,

Bombay, May 17th. W. H. Vakeel.

PEPTIC ULCER

To the Editor of The Lancet

Sir,—I should like to make three corrections to the report of my opening speech at the Fellowship of Medicine debate on the treatment of peptic ulcer which appeared in your last issue.

1. Lord Moynihan did not contend ten years ago that an ulcer large enough to be demonstrable by the X rays could not be cured except by operation, but he told me that he had not yet seen radiological evidence that such an ulcer could be cured.

2. All symptoms and radiological signs of an enormous gastric ulcer had disappeared at the end of three months in the test case with which I convinced Lord Moynihan; there has been no recurrence in the ten years which have since elapsed.

3. I did not say that I had never seen perforation after proper medical treatment for a sufficiently long time, but that I had never seen perforation occur in a patient whilst under strict medical treatment.

I am, Sir, yours faithfully,

Arthur F. Hurst.

New Lodge Clinic, Windsor Forest, June 11th.

THE HEALTH OF NURSES IN TRAINING

To the Editor of The Lancet

Sir,—You recently published figures regarding the incidence of illness among nurses at St. Bartholomew's Hospital (The Lancet, Jan. 13th, 1934, p. 91). It may be of interest to record the experiences of the last three years at the Royal Free Hospital.

With a daily average of 125 nurses for the whole period, the average daily deficiency on account of illness was:—

1931	4·78 per cent.
1932	2·21 ,, ,,
1933	1·90 ,, ,,

making 2·9 per cent. average daily deficiency for three years. The incidence of sickness among first year nurses was high in each year and formed 50 per cent. of the total in the three year period, second year nurses accounting for 26 per cent. and third year nurses 24 per cent.

At the Royal Free, as at St. Bart.'s, a high proportion of the illnesses were due to throat infections and their complications; also there was more illness in the winter than in the summer.—I am, Sir, yours faithfully,

Dorothy C. Hare,
Physician to the Royal Free Hospital.

Weymouth-street, W., June 10th.

A GRAVE PROTEST

The Proprietors of The Lancet, Ld.

Dear Sirs,—On page 1254 of The Lancet dated 9/6/34 there is a paragraph about me. It is correct so far as culled from the "Medical Directory" and "Kelly's Directory."

A sine qua non of such a notice is the death of the subject, and I submit to you "I am not dead, never have been, and that I am in no earthly hurry."

In regard to this paragraph I will be glad to hear from you what you mean to do.

I am yours faithfully,

James Taylor.

Ugie House, Keith, Banffshire, June 10th.

⁂ We offer sincere apologies for the sad error which was due to a series of misunderstandings. We are aware of the pain as well as inconveniences which might follow upon such a mistake and hope that no such results in this case have occurred.—Ed. L.

ANAEROBIC CULTURE OF FÆCES

To the Editor of THE LANCET

SIR,—In 1926 a case was sent to me clinically diagnosed as suffering from some bacterial toxæmia. The Ministry of Pensions, with whom I subsequently had some correspondence on the case, stated that no infection had been demonstrated—and in fact my aerobic culture of the fæces showed nothing of importance. But anaerobic culture showed a streptococcal infection, and on a vaccine of this the patient got quite well.

I have examined a number of similar cases since then. One has some points of interest. He was clinically suspected of duodenal ulcer. X ray was negative. Aerobic culture showed a definite streptococcal infection of the fæces. On a vaccine of this the patient improved up to a point, after which this vaccine produced no further improvement. Anaerobic culture of the fæces was then undertaken and showed a definite infection with anaerobic streptococci. The first dose, a vaccine of these, produced a sharp reaction in the patient, and this vaccine led to an immediate and complete cure. During the treatment the patient himself commented on the fact that the second vaccine was doing him far more good than the first.

Another perhaps worth mentioning was a severe case of menorrhagia of puberty resistant to all previous treatment. A bacteriological examination of swabs of vagina and cervix had already been reported negative. Anaerobic culture showed a heavy infection of streptococci. Anaerobic culture of fæces showed the same streptococci, as far as could be presumed from the appearance of the colony. With this evidence in hand X ray examination was undertaken and showed a diseased appendix. The appendix was removed and a vaccine of the anaerobic streptococci was given. A complete cure resulted.

I think these cases are worth reporting to suggest that greater success with vaccines might be obtained if anaerobic culture was more frequently employed in a case suspected of intestinal toxæmia, when aerobic culture is negative or the aerobic vaccine is only partly successful.

I am, Sir, yours faithfully,

C. B. DYSON,

Assistant Bacteriologist, Inoculation Department,
June 11th. St. Mary's Hospital, Paddington.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

Arc-Lamp Carbon Duty

IN the House of Commons, on June 4th, when the Finance Bill was being considered in committee, Mr. DAVID GRENFELL moved an amendment to provide that the new customs duty on arc-lamp carbons should be 1*s.* 6*d.* a lb. for carbons exceeding 14 mm. in diameter, instead of 5*s.* as proposed in the Bill. He feared that this high duty would curtail facilities in connexion with hospitals.—Sir PERCY HARRIS supported the amendment. The consulting engineer of St. Bartholomew's Hospital had told him that as a result of long and laborious experiments he had found that the imported article was the only carbon that could be relied on to give perfect treatment without risk or danger to the patient and to the satisfaction of the doctor. It was not, he said, a question of price, because the continental carbon was more expensive; it was bought because it was more satisfactory.

Dr. BURGIN, Parliamentary Secretary to the Board of Trade, said that when this matter was last before the committee (April 26th) the Chancellor of the Exchequer said that before the question came before the House again there would be ample opportunity to consider representations, and on behalf of the Board of Trade he had offered to give attention to any fresh considerations. There had been, in fact, no response to that invitation. It was estimated that arc-lamp carbons taken by hospitals were something under 2 per cent. of the total consumption of carbons. Assurances had been given to the Government that British manufacturers were in a position to supply the whole requirements of the country, and undertakings had been given that the price of British carbons would not be increased. If consumers desired to use foreign carbons they would have to pay the duty on them.

The amendment was negatived by 243 votes to 45.

Children and the Unemployment Bill

In the House of Lords, on June 5th, Lord ROCHESTER, Paymaster-General, moved the second reading of the Unemployment Bill, which has already passed through the House of Commons.—Lord MARLEY said the B.M.A. committee on nutrition had reported that to feed a child of 1 to 2 years of age the minimum sum necessary per week was 2*s.* 8*d.*, for a child of 3 to 6 years 3*s.* 4½*d.*, for a child from 8 to 10 years of age 4*s.* 2*d.* This Bill allowed only 2*s.* Even if they gave a child one pint of milk a day only, and nothing else, that would come to 1*s.* 9*d.* a week. The sum provided in the Bill was, he felt, utterly inadequate, and meant then the continuation of the under-nourishment of children in order to provide for the solvency of the Unemployment Insurance Fund. The Labour party were opposed to this Bill root and branch.—Lord ELTON suggested there was ground for optimism in Sir George Newman's observation that during 1932, in the period of deepest depression, the two most characteristic tests of malnutrition—infantile mortality and deaths from tuberculosis—had not only decreased, but were the lowest on record. Malnutrition undoubtedly existed, and had done so under all Governments, but they hoped that this Bill was likely to decrease it.

Milk-supply and Public Health

In the House of Commons, on June 7th, Mr. ELLIOT, Minister of Agriculture, moved the second reading of the Milk Bill. The main objectives before the Government, he said, were to secure an increased consumption of pure liquid milk in this country, to secure the confidence of the public in the purity of its milk supplies, and thirdly, to hold the position while those two campaigns were got under way by advances for manufacturing milk. The Bill did not refer specifically to the provision of milk in schools, but it had been announced by him in February last that the Government would only make grants in aid of an approved programme of publicity to be submitted by a Milk Marketing Board if the programme contained among other things provision for the supply of milk to schools at reduced rates. That assurance stood. The objections which had been raised to the Bill were, first, that the Government were encouraging the production of milk products in preference to the increase in the consumption of fresh milk, and secondly, that they failed to make adequate provision for the eradication of disease from cattle.

To take the second point first, he was assured by his technical advisers that in the provisions which the Government were now making they were proceeding as rapidly as was reasonable considering the supplies, both of men and money, available for the eradication of disease from our herds. The programme laid down by the Cattle Diseases Committee envisaged a plan covering a considerable length of time. For instance, on pasteurisation they suggested that large municipalities ought to have the right to require that after two years' notice all milk, except sterilised milk, sold within their boundaries which was not derived from herds free from tuberculin should be pasteurised, but that the power to exercise the right should be deferred for three years, making a total of five years before they would consider it was possible to arrange for any large supply of tubercle-free cattle. The Government programme providing for the payments of premiums to attested herds should bring them perhaps a thousand herds in the first year, but the difficulty of providing and maintaining these herds was so considerable that any rapid expansion in the provision of this stock was unlikely.

But quite apart from lack of men and money, a general campaign of slaughter of infected cows in this country was out of the question because of the lack of milk which would ensue. If they were to start on this very big programme they must have the assurance of continuity, and that assurance he thought they had. The cost of carrying out the proposals brought forward by the Opposition for the supply of milk to children in the public elementary schools would be vastly greater than that of the Government's proposals. They had to deal with the stress upon the industry as well as the desirability of providing milk in the schools.

Sir S. Cripps then moved an amendment :—

> That whilst this House is of opinion that the wider distribution of a pure and efficient milk-supply is an urgent necessity, it cannot assent to the Second Reading of a Bill which is designed to encourage the production of milk products in preference to an increase in the consumption of fresh milk amongst the children in public elementary schools and at a price within the reach of the poorer households, and which, in view of the recent report of the Economic Advisory Council, fails to make adequate provision for the eradication of disease from cattle.

In the course of debate Sir Ernest Graham-Little said he would support the amendment because he thought it appeared to offer that practical stimulus to consumption which should precede any other factor in the Bill. The urgency of distributing milk to school-children ought to determine their action that night. There could be no immediate supply if they were to wait for the cleaning up of the herds, which in any case could not be applied to every disease derived from milk. Milk was the best medium for the growth of the tubercle bacillus, and milk tanks were practically uniformly infected with tubercle. People asserted that pasteurisation destroyed the value of the milk, but that was probably an entirely fallacious statement. It was obviously wrong to distribute a product which could cause widespread disease, and must cause it if there was no economical method of rendering that product safe and clean. It had become the opinion of the medical profession that to distribute milk of any kind in the fresh state was unwise. There was freedom from tubercle in tuberculin-tested milk, but no freedom from other infections. He believed that the distribution of milk in bulk, as was now immediately possible, would result in the improvement of nutrition of the children, and at a relatively small expense pasteurisation would secure their safety from any disease infecting that milk.

The amendment was rejected by 190 votes to 47, and the Bill was then read a second time.

Road Accidents

When the Road Traffic Bill was being further considered by a Standing Committee of the House of Commons on June 7th, Mr. Guy moved the following new clause :—

> (1) Where medical or surgical treatment or examination is immediately required as a result of bodily injury (including fatal injury) to any person caused by, or arising out of, the use of a motor vehicle on a road, or in a place to which the public have a right of access, and the treatment or examination so required (in this section referred to as "emergency treatment") is effected by a registered medical practitioner, the owner of the vehicle shall, on a claim being made in accordance with the provisions of the next succeeding section, pay to the practitioner, or, where emergency treatment is effected by more than one practitioner, to the practitioner by whom it is first effected—
>
> (*a*) a fee of twelve shillings and sixpence in respect of each person in whose case the emergency treatment is effected by him ; and
>
> (*b*) a sum, in respect of any distance in excess of two miles which he must cover in order to proceed from the place whence he is summoned to the place where the emergency treatment is carried out by him and to return to the first-mentioned place, equal to sixpence for every complete mile and additional part of a mile of that distance.
>
> (2) Where emergency treatment is carried out in a hospital (that is to say, an institution, not being an institution carried on for profit, which provides medical or surgical treatment for in-patients) the provisions of the foregoing subsection with respect to the payment of a fee shall have effect with the substitution of references to the hospital for references to a registered medical practitioner.
>
> (3) Liability incurred under this section by the owner of a vehicle shall, where the event out of which it arose was caused by the wrongful act of another person, be treated for the purposes of any claim to recover damage by reason of that wrongful act as damage sustained by the owner.
>
> (4) A policy of insurance or a security in respect of third-party risks shall not be deemed to comply with the requirements of Part II. of the principal Act unless the owner of the vehicle to which it relates is specified therein for the purposes of paragraph (*b*) of Subsection (1) of Section 36, or of Section 37 of the said Act, as the case may be, and, notwithstanding anything in the proviso to paragraph (*b*) of Subsection (1) of the said Section 36, any liability which may be incurred under this section by the owner shall be deemed to be a liability required to be covered under that paragraph.

Last year, he said, Parliament provided certain payments to hospitals in the Road and Rail Act, but no provision had been made for emergency treatment by doctors or the hospitals for first aid. The fee of 12*s.* 6*d.* mentioned in the clause was, he thought, a reasonable one. The proposal was that payment should be made irrespective of any question of negligence. His information was that the total cost of this first-aid treatment and the payment in respect thereof would be in the neighbourhood of £250,000, or probably less. This would mean an additional insurance premium of something like 2*s.* 6*d.*

Sir Ernest Graham-Little, speaking for King Edward's Hospital Fund for London and the British Hospitals Association, supported the new clause which, he understood, was to follow the clause at present before the Committee.

Mr. Oliver Stanley (Minister of Transport) said that everybody recognised the great hardships caused to doctors by the additional calls to road accidents and the extreme difficulty they had in getting payment for their services, but it was only right that hon. Members should realise that they were altering the principle that a man was liable only for his own negligence. Up to now the whole of insurance had been on that basis, and he feared the effect of extending it.

The new clause was read a second time by 14 votes to 9 and was added to the Bill. The committee when it met on June 12th agreed to an amendment to this clause proposed by Mr. Stanley providing that liability for payment for emergency treatment should be placed on the user of the vehicle at the time that the accident occurred. It was, he said, advisable to follow the provision of the Act of 1930, which attributed the provision of third party risk to the user and not the owner of a motor vehicle, and not to attach to the owner new and different risks which he was not at present compelled to cover by insurance. Doctors and hospitals, he added, would not suffer in any way by confining their claim to the person using the vehicle at the time of the accident.

A new clause moved by Sir Francis Fremantle providing machinery for the recovery of claims on the part of doctors and hospitals was also read a second time and added to the Bill.

HOUSE OF COMMONS

THURSDAY, JUNE 7TH

Water Shortage in England

Mr. Bernays asked the Minister of Health whether he was in a position to make a statement on the water shortage in England.—Mr. Shakespeare (Parliamentary Secretary to the Ministry of Health) replied : My right hon. friend is advised that the position over a large part of the country, the north and east, Wales and the west and the south-west, as well as part of the Midlands, is generally better than it was a month ago. The south and south-east have not shared in the improvement. He has no reason to think that water undertakers will not be able to meet the situation, provided consumers play their part by reasonable economies in the use of water. The coöperation so far given by them accounts largely for improved conditions. In rural areas with defective supplies, the authorities should expedite measures for permanent schemes, with the grant available under the Rural Water Supplies Act.

Mr. JOEL asked the Minister of Health the number of empty or relatively empty reservoirs now in this country and the towns which normally relied on such reservoirs; and the precautions being taken to safeguard the well-being of the townsfolk affected.—Sir HILTON YOUNG replied: I am not aware of any empty or relatively empty reservoirs. In some areas reserves are seriously low. Active steps have been taken in these areas to conserve supplies, with the coöperation of consumers, and to augment the supplies. Where further powers are necessary these can be obtained expeditiously by procedure under the Water Supplies (Exceptional Shortage Orders) Act recently passed.

Kilmainham Hospital Trust

Captain CUNNINGHAM-REID asked the Financial Secretary to the War Office when it was anticipated that the trust relating to Kilmainham hospital would be closed finally.—Sir FREDERICK THOMSON (Treasurer of the Household) replied: I regret that I am unable to say.

Blood Tests for Inebriates

Mr. HALES asked the Home Secretary if he was aware that in Sweden a blood test was taken of a person charged with drunkenness; and, having regard to the satisfactory results therefrom, if he would consider the desirability of taking steps to introduce the same procedure into this country.—Sir JOHN GILMOUR replied: I am aware of the test to which my hon. friend refers. Evidence derived from a blood test is sometimes given in this country in cases where drunkenness is an element in a criminal charge, but I have no power to require any person to submit to such a test.

Factories Report

Mr. RHYS DAVIES asked the Home Secretary when the report for the last year of the chief inspector of factories and workshops would be issued.—Sir JOHN GILMOUR replied: I hope the report will be issued by the middle of next month.

MONDAY, JUNE 11TH

Doctors' Telephones in Remote Country Districts

Sir ROBERT HAMILTON asked the Postmaster-General what the rental charges would be under the proposed new scale for a doctor's telephone in a country district in Shetland, now charged at £12 per annum.—Sir KINGSLEY WOOD replied: I understand the hon. Member to refer to a subscriber who does not come within the ordinary tariff conditions but pays a specially assessed rental. The question whether any rental reduction can be made in such cases is under consideration.

State Inspection of Private Schools

Mr. ERNEST EVANS asked the Parliamentary Secretary to the Board of Education whether His Majesty's Government accepted in principle the recommendations of the departmental committee on private schools in favour of State inspection of such schools and the acquiring by the State of power to compel the closing of any such schools as might be found to be unsatisfactory; and whether he proposed to introduce legislation designed to effect such objects and, if so, when.—Mr. RAMSBOTHAM replied: As indicated in the answer given on March 29th, 1933, there can be no question of proceeding in the near future with the legislation which would be required to give effect to the main recommendations of this committee. I regret, therefore, that I am not at present able to inform the hon. Member of the views of His Majesty's Government on the various recommendations of the committee.

OBITUARY

GEORG WALTHER GRODDECK

To a circle of friends and patients in many countries the death of Dr. Groddeck, of Baden Baden, in his 68th year, will bring a sense of irreparable loss. It comes at the moment when his methods and philosophy were beginning to attract public attention in England both in the world of medical psychology and in the field of general literature. He brought to his psychotherapeutic works the creative vision of the artist—almost all his early writings were literary works, fiction, poetry, belles-lettres, criticism—as well as long experience with cases of chronic disease of every kind, for his sanatorium at Baden Baden was the refuge of any patient who had been abandoned by others as impossible to help.

Groddeck's earlier methods were based on those of Schweninger, Bismarck's physician, under whom he studied at the university and whom he afterwards assisted in practice. Little use was made of drugs; his regimen included dieting, local applications of heat and deep massage given by the doctor himself. In "Das Buch vom Es" he recounts how the curious symptoms of a patient first led him to realise the influence of unconscious forces in producing disease. He gradually came to the theory of unconscious motivation in every kind of disease, and step by step elaborated a technique of psychotherapy which he tested on all his patients. Massage and heat he never abandoned, but dieting seemed to him less and less important as his psychological work developed. In 1917 the publication of a brochure upon mental factors in the determination of organic disease led to his friendship with Freud, whose work he never wearied of extolling in everything he wrote, and later to his joining the Psycho-Analytical Society, of which Freud was then president. He never however abandoned his independent outlook nor his own developing technique.

Three years ago he suffered from a severe illness which left him physically exhausted, and although he still opened his sanatorium for the summer months each year, it was obvious that the work imposed a heavy strain upon his strength. On Whitsunday he was obliged to give it up and on June 11th he died in his sleep in a sanatorium near Zurich.

WILLIAM SIMMS, L.D.S. R.C.S. Irel., M.Sc. Manch.

THE death was announced recently of Mr. William Simms, a well-known figure in the world of dentistry and at one time dean of the dental school of the University of Manchester.

William Simms was born in 1856 and entered dental practice, as was common 50 or 60 years ago, as an apprentice. Under the Dentists Act of 1878 he was registered as qualified, being recognised at the passing of the Act as engaged in bonâ-fide practice of dentistry, but two years later he obtained by examination the diploma of L.D.S. R.C.S. Irel. He was early to display a scientific interest in the development of his branch of the profession by writing on the uses of cocaine in dentistry, the employment of which as a local anæsthetic was at that time an innovation. He became interested in prosthetic work and recently produced a Manual of Dental Prosthetics, a résumé of his experience throughout a long period, for it was not published till he was over 70 years of age. He was responsible for the shape of the curriculum for the dental degree at Manchester, and as clinical teacher, lecturer, examiner, and dean of the Dental School he was a valuable member of the teaching staff of the University. In 1930 the University conferred on him the degree of Hon. M.Sc.

MEDICAL NEWS

University of Cambridge

On June 8th the following degrees were conferred :—

M.B., B.Chir.—H. T. Cox (by proxy), W. R. Billington, R. V. Payne, H. D. White, William Wilson, and J. L. Parker.

B.Chir.—E. J. Neill and W. E. Tucker (by proxy).

The title of the degree of M.D. has been conferred on Mrs. A. G. Dauncey.

University of London

At recent examinations the following candidates were successful :—

THIRD EXAMINATION FOR M.B., B.S.

Honours.—(*a*) R. H. R. Belsey, St. Thomas's Hosp.; (*a, d*) E. W. Bintcliffe, St. Bart.'s Hosp.; (*b, d*, University Medal) Edith J. R. Browne, Roy. Free Hosp.; (*b*) A. M. R. Cann, Middlesex Hosp.; (*e*) D. R. Davies, Univ. Coll. Hosp.; (*e*) R. R. Henderson, St. Thomas's Hosp.; (*a*) E. G. Jones, St. Bart.'s Hosp.; (*a*) L. E. Jones, St. Thomas's Hosp.; (*b*) Beryl Twyman, Univ. Coll. Hosp.; and (*e*) Sylvia V. F. Wolfe, Roy. Free Hosp.

(*a*) distinguished in medicine; (*b*) distinguished in pathology; (*d*) distinguished in surgery; (*e*) distinguished in obstetrics and gynæcology.

Pass.—Mary A. C. Adams, Roy. Free Hosp.; J. L. Bates, Guy's Hosp.; Mary A. M. Bigby, Roy. Free Hosp.; Eileen A. Chennell, St. Mary's Hosp.; J. A. Chivers, St. Bart.'s Hosp.; J. G. R. Clarke, St. Thomas's Hosp.; Doris Cohen and Beryl D. Corner, Roy. Free Hosp.; C. F. Critchley, St. Thomas's Hosp.; E. A. Danino and D. M. Dean, St. Bart.'s Hosp.; C. B. Dharmasena, Ceylon Med. Coll. and St. Bart.'s Hosp.; Israel Doniach, Univ. Coll. Hosp.; O. G. Edholm, St. George's Hosp.; R. T. Elven, Guy's Hosp.; Nancie I. Faux, Roy. Free Hosp.; Constance E. Field, Univ. Coll. Hosp.; J. M. Flower, Westminster Hosp.; H. E. D. Gale, St. Bart.'s Hosp.; C. J. Gavey, London Hosp.; Nathan Green and J. T. Griffiths, Univ. Coll. Hosp.; Hilary Gunton, Roy. Free Hosp.; R. M. Haines, Westminster Hosp.; S. T. Hayward, St. Bart.'s Hosp.; Alice M. Head, Roy. Free Hosp.; G. F. Henderson, Univ. Coll. Hosp.; E. F. Hewlitt, Guy's Hosp.; A. C. Howard, Univ. Coll. Hosp.; H. C. Hugh, St. Bart.'s Hosp.; N. M. Jacoby, Guy's Hosp.; Elizabeth M. James, Roy. Free Hosp.; Margaret H. James, Univ. Coll. Hosp.; H. W. E. Jones and W. S. G. Lawson, St. Thomas's Hosp.; H. B. Lee, St. Bart.'s Hosp.; Rosamund M. I. Mackay, Univ. Coll. Hosp.; G. A. Mais, St. Thomas's Hosp.; S. P. Mason and P. H. Nankivell, Middlesex Hosp.; Doris E. Oxford, Roy. Free Hosp.; Harold Royle, St. Bart.'s Hosp.; G. C. Sawyer, Guy's Hosp.; Margaret H. Scott, Roy. Free Hosp.; Charlie Seeley, St. Mary's Hosp.; H. L. Selwyn and Ralph Shackman, St. Bart.'s Hosp.; J. V. Shemilt and D. G. Snell, St. Thomas's Hosp.; W. P. Stamm, Guy's Hosp.; M. G. Stratford, Univ. Coll. Hosp.; Mary G. Tate, Roy. Free Hosp.; W. P. McK. Telfer, St. Bart.'s Hosp.; T. P. Thamotheram, Ceylon Med. Coll. and King's Coll. Hosp.; Elisabeth J. McQ. Thomas, A. S. Thorley, and W. W. Walther, Univ. Coll. Hosp.; S. H. Wass, Guy's Hosp.; and Elizabeth B. White, Roy. Free Hosp.

The following students have passed in one of the two groups of subjects :—

Group I.—S. H. Alavi, St. Thomas's Hosp.; G. W. Bender, St. Mary's Hosp.; D. M. Blomfield, St. Bart.'s Hosp.; J. A. Brocklebank and I. A. Cathie, Guy's Hosp.; Enid S. Davies, Univ. Coll. Hosp.; Audrey P. Dence, Roy. Free Hosp.; D. G. ff. Edward, St. Bart.'s Hosp.; Evelyn J. Forgan, Roy. Free Hosp.; W. T. J. Fowler, Guy's Hosp.; Joan I. Franklin-Adams, Roy. Free Hosp.; D. B. Hyslop, Charing Cross Hosp.; A. D. Iliff and F. A. Jones, St. Bart.'s Hosp.; Margaret M. C. Louden, Roy. Free Hosp.; J. I. Maran, Univ. Coll. Hosp.; G. D. Morgan, Charing Cross Hosp.; Barbara G. Morton, Roy. Free Hosp.; F. E. Norris, London Hosp.; D. S. Piper, Guy's Hosp.; Irene E. Sandford, Roy. Free Hosp.; K. G. Seager, St. Mary's Hosp.; H. W. G. Staunton, St. Bart.'s Hosp.; D. L. McK. Stewart, King's Coll. Hosp.; H. A. Thomas, Univ. Coll. Cardiff and Univ. Coll. Hosp.; Sarah C. B. Walker, Roy. Free Hosp; and M. E. Wigfield, St. Thomas's Hosp.

Group II.—H. H. Atkinson, Univ. Coll. Hosp.; E. A. Bisson, London Hosp.; Muriel Boycott, Univ. Coll. Hosp.; D. J. T. Brinkworth, Middlesex Hosp.; Robert Bruce, King's Coll. Hosp.; Ronald Carpenter and R. F. Clarke, St. Bart.'s Hosp.; C. W. J. Claydon, *King's Coll. Hosp.; D.* W. A. Degazon, Univ. Coll. Hosp.; Lynette Dowsett, Roy. Free Hosp.; H. D. Fairman, London Hosp.; E. D. Falconer, Guy's Hosp.; T. F. R. Griffin, St. Mary's Hosp.; A. W. J. Houghton, St. Bart.'s Hosp.; Joyce B. Jewson, Roy. Free Hosp.; W. L. Kerr and G. A. Kiloh, King's Coll. Hosp.; J. R. Kingdon and K. A. Latter, St. Bart.'s Hosp.; Sidney Lee, Westminster Hosp.; C. F. Mayo-Smith, St. George's Hosp.; R. H. Purnell and D. C. Reavell, St. Bart.'s Hosp.; J. D. Richardson, King's Coll. Hosp.; A. T. Roden, St. Bart.'s Hosp.; Catherine L. Simmons, Roy. Free Hosp.; B. W. Smith, Guy's Hosp.; M. C. L. Smith, St. Bart.'s Hosp.; E. J. Somerset, King's Coll. Hosp.; W. H. C. Spooner, St. Mary's Hosp.; K. F. Stephens, St. Bart.'s Hosp.; Margaret E. Sutherland, Roy. Free Hosp.; R. E. Thomas, Univ. Coll. Hosp.; W. F. Townsend-Coles, London Hosp.; R. J. Vakil, St. Thomas's Hosp.; and E. C. Zorab, Guy's Hosp.

University of Sheffield

The title of emeritus professor has been conferred on Dr. Edward Mellanby, F.R.S., secretary to the Medical Research Council, and formerly professor of pharmacology in the University.

Mr. John Keall has been re-elected president of the Pharmaceutical Society of Great Britain for another year.

THE Department of Health for Scotland state that from June 25th the headquarters of the dental officer for Scotland will be transferred to 136, Renfield-street, Glasgow, C.2.

University of Wales

The Cecil Prosser research scholarship (value £250) will shortly be awarded for research in the department of tuberculosis. Further particulars will be found in our advertisement columns, and applications should reach the registrar at the University Registry, Cathays Park, Cardiff, not later than Sept. 1st.

Scottish Board of Control

Dr. William N. J. Chapman has been appointed a deputy commissioner of the General Board of Control for Scotland. Dr. Chapman is at present assistant medical officer to the Lanark district asylum, Hartwood.

Anti-Noise League

A conference will be held by this league in University College, Oxford, from July 13th to 16th under the chairmanship of Lord Horder. The work of the conference has been arranged under four heads: Dr. William Collier is chairman of the health and noise group and the speaker is Dr. Dan McKenzie, while Sir James Purves-Stewart will preside over the science and noise group and Dr. G. W. C. Kaye will speak. During the conference an exhibition will be held displaying noise-measuring instruments, noise-abatements appliances, and examples of sound-proofing and absorption, &c. The secretary of the league may be addressed at 18, Old Cavendish-street, London, W.1.

Cancer Hospital (Free), London

In March, 1933, the International Cancer Research Foundation, established by Mr. William H. Donner of Philadelphia, awarded a sum of £1000 per annum for a period of two years to the research institute of this hospital in support of investigations into factors which underlie the origin of malignant growths. This grant has provided two research scholarships, which are held by Mr. G. A. D. Haslewood, M.Sc., who is working with Mr. J. W. Cook, D.Sc., and by Miss Edna Roe, B.Sc., who is studying the molecular structure of carcinogenic compounds by physical methods under Mr. W. V. Mayneord, M.Sc., in the physics section of the radiological department of the hospital. Under the direction of Mr. Cook, Mr. Haslewood has recently prepared a very active cancer-producing compound, methylcholanthrene, from another compound, deoxycholic acid, which is known to occur in the human body. To assist in further developments of this work the trustees of the foundation have decided that this grant shall be continued for an additional three years.

British Social Hygiene Council

The summer vacation school in connexion with this council will be held at Digswell Park Conference House, Welwyn Garden City, from Monday, June 25th, to Saturday, June 30th. The programme is designed to present the scientific background of social hygiene as a coherent whole and will consist of three courses, of five lectures each, on (1) anthropology, by Dr. Raymond Firth, lecturer on the subject at the London School of Economics; (2) biology, by Mr. D. Ward Cutler, deputy-director, Rothamsted; and (3) psychology, by Prof. A. E. Heath, professor of philosophy, Swansea. The lectures will deal with the fundamental principles of the subjects as related to the problems of daily life both at home and abroad. It is hoped that magistrates, clergy, doctors, and probation officers will take advantage of this opportunity of studying the scientific bases of marriage and their bearing on conjugal relationships. The vacation school will be inaugurated by an address from Prof. F. A. E. Crew, director of the Institute of Animal Genetics at Edinburgh. In connexion with the school the membership fee is a guinea and the boarding fee £2 7*s.*, while railway fares are those of the summer tickets now in force. Various facilities are being provided for recreation and amusement free of charge, and information on these and other subjects may be obtained from Miss Grant, Secretary, British Social Hygiene Council, Carteret-street, London, S.W.1.

Appointments

Bown, D. G., M.B., B.S. Lond., F.R.C.S. Eng., has been appointed Certifying Surgeon under the Factory and Workshop Acts for Clacton, Essex.

Goddard, Charles E., O.B.E., M.D. Durh., T.D., whole-time Medical Officer to the enlarged district of Wembley.

Orley, Alexander, M.D. Geneva, D.M.R.E. Camb., Honorary Assistant Radiologist to the West End Hospital for Nervous Diseases.

London County Council Hospital Staff.—The following appointments, promotions, and transfers are announced. A.M.O. (I.) and (II.) = Assistant medical officer, Grades I. and II. Temp. = temporary.

Leslie, W., M.B., F.R.C.S., Senior A.M.O. (II.), St. Stephen's.

Clough, G. M., M.B., Ch.M. Sydney, M.R.C.P. Lond., Temp. A.M.O., St. James's.

Critchley, C. F., M.R.C.S. Eng., Clinical Assistant, St. Giles.

James, M. F., M.B. Lond., House Physician, Queen Mary's Hospital for Children.

McDade, R. S. C., M.B. Camb., A.M.O. (I.), High Wood Hospital for Children.

Murray, M. G., M.B. Aberd., A.M.O. (I.), St. George-in-the-East.

Macdonald, C. R., F.R.C.S., M.B. Edin., A.M.O. (I.), St. Leonards.

Brown, W., M.B. N.Z., A.M.O. (II.), New End.

Rutter, T. E., M.B. Edin., A.M.O. (II.), Highgate.

Kaines, G. E., M.B. Melb., A.M.O. (II.), Dulwich.

Evans, J. G., M.R.C.S. Eng., A.M.O. (II.), Fulham.

Cardwell, E., L.R.C.P. Edin., A.M.O. (II.), St. Benedict's.

Avery, J. C. H., M.B. Lond., A.M.O. (I.), Queen Mary's Hospital for Children.

Devlin, W. L., M.B. Belf., A.M.O. (II.), Norwood Hospital for Children.

O'Sullivan, J. A., M.D. Dubl., A.M.O. (I.), St. Peter's.

Wright, E. M., B.M. Oxon., A.M.O. (I.), Brook.

Young, B. A., M.D., M.R.C.P. Lond., Senior Assistant Medical Officer (I.), St. Peter's.

Spurgin, P. B., M.R.C.S. Eng., Temp. Visiting Medical Officer, St. Marylebone Institution.

Vacancies

For further information refer to the advertisement columns

Albert Dock Hospital, Connaught-road, E.—Res. M.O. At rate of £110.

Bagdad. Royal College of Medicine.—Chair of Materia Medica. Salary at rate of I.D. 960 to I.D. 1200 per annum.

Birmingham Children's Hospital.—Res. Surg. O. £175.

Birmingham City.—P.H. Dept., Sen. Asst. M.O. for Tuberculosis Section. £750.

Blackburn Roy[illegible] O. £150.

Bolton Royal I[illegible]

Bradford Child[illegible] st. Surgeon.

Brighton, Royal Sussex County Hospital.—Two Hon. Med. Regs., Three Hon. Surg. Regs., and Hon. Dermatological Clin. Asst.

Bristol Eye Hospital.—Asst. Res. H.S. At rate of £100.

Bristol General Hospital.—Sen. Res. M.O. £200. Cas. H.S. At rate of £100. Also Two H.P.'s., Two H.S.'s., Res. Obstet. O., and H.S. to Spec. Depts. Each at rate of £80.

Bristol, Winford Orthopædic Hospital.—Hon. Dental Surgeon.

Cardiff, University College of South Wales and Monmouthshire.—Asst. Lecturer in Anatomy. £400. Asst. Lecturer in Physiology. £400. Asst. Lecturer in Histology. £300.

Cardiff, Welsh National School of Medicine.—Part-time Demonstrator in Materia Medica, &c. At rate of £50.

Central London Ophthalmic Hospital, Judd-street, W.C.—Sen and Jun. H.S.'s. £120 and £100 respectively.

Charterhouse Rheumatism Clinic, Crosby Row, Long-lane, S.E.—Two Hon. Clin. Assts.

Chesterfield and North Derbyshire Royal Hospital.—H.S. At rate of £150.

Colchester, Essex County Hospital.—H.P. £150.

East Ham Memorial Hospital, Shrewsbury-road, E.—Hon. Ophth. Surgeon.

Exeter, Royal Devon and Exeter Hospital.—H.S. to Ear, Nose, and Throat Dept. At rate of £150.

Folkestone Royal Victoria Hospital.—Sen. and Jun. Res. M.O.'s. At rate of £150 and £120 respectively.

Gloucestershire Royal Infirmary, &c.—H.P. and H.S. Each at rate of £150.

Great Yarmouth General Hospital.—H.S. £140.

Hospital for Sick Children, Great Ormond-street, W.C.—H.S. At rate of £100.

Hull Royal Infirmary.—Cas. O., also Third H.S. Each at rate of £150.

Ilford, King George Hospital.—Cas. O. £130.

Indian Medical Service.—Commissions.

Ipswich, East Suffolk and Ipswich Hospital.—H.P. £120.

King's College Hospital, Denmark Hill, S.E.—Hon. Radiologist.

Liverpool, Alder Hey Children's Hospital.—Res. Asst. M.O. £200.

Liverpool, City Infectious Diseases Hospitals.—Asst. Res. M.O. £200.

London Homœopathic Hospital, Great Ormond-street, Bloomsbury, W.C.—Res. M.O. At rate of £100.

London Jewish Hospital, Stepney Green, E.—Hon. Surgeon.

London University.—Examinerships.

Manchester, Christie Hospital and Holt Radium Institute, Withington.—Res. M.O. At rate of £150.

Manchester Royal Eye Hospital.—Jun. H.S. £120.

Metropolitan Hospital, Kingsland-road, E.—Cas. O. At rate of £100.

Middlesex County Council.—Tuberculosis M.O. £750.

Ministry of Health.—Two Medical Officers. Each £833.

Nelson Hospital, Merton, S.W.—Res. H.S. At rate of £100.

Newcastle-upon-Tyne Hospital for Sick Children.—Res. Surg. O. £250.

Newcastle-upon-Tyne Royal Victoria Infirmary.—Two Anæsthetists to Leazes Hospital. Each at rate of £100. Also H.P.'s and H.S.'s to Special Depts. Each at rate of £50.

New Zealand, Wellington Hospital Board.—£1100.

Northampton General Hospital.—H.S. to Ear, Nose, and Throat Dept. At rate of £150.

Norwich, Norfolk and Norwich Hospital.—H.S. to Spec. Depts. £100.

Nottingham Children's Hospital.—Res. H.S. At rate of £150.

Portsmouth Royal Hospital.—H.P. and H.S. Each at rate of £130.

Preston County Mental Hospital, Whittingham.—Jun. Asst. M.O. £500.

Princess Elizabeth of York Hospital for Children, Shadwell, E.—H.P., and H.S. Each at rate of £125.

Prince Louise Kensington Hospital for Children, St. Quintin-avenue, W.—H.P. and H.S. Each at rate of £100.

Queen Charlotte's Maternity Hospital, Marylebone-road, N.W.—Two Res. Anæsthetists. Each at rate of £100.

Queen's Hospital for Children, Hackney, E.—Surgeon for Ear, Nose, and Throat Dept.

[illegible] -H.S. £150.

[illegible] *Park, W.*—Res. M.O. £300.

[illegible] £250.

Salford Royal Hospital.—Dist. M.O. for Pendleton Area. £200.

Scarborough Hospital and Dispensary.—H.S. At rate of £175.

Sheffield Children's Hospital.—H.S. Also H.P. Each at rate of £100.

Shrewsbury, Royal Salop Infirmary.—Cas. O. and Res. Anæsthetist. At rate of £160.

Smethwick County Borough.—Asst. M.O.H. and Asst. School M.O. £500.

Southampton, Royal South Hants and Southampton Hospital.—H.P., Cas. O., Res. Anæsthetist, and H.S. for Ear, Nose, and Throat Dept. H.S. Each at rate of £150. Also Sen. H.S. £200.

Southend-on-Sea General Hospital.—Hon. Visiting Obstet. and Gynæcological Surgeon.

Stamford, Rutland and General Infirmary.—H.S. At rate of £200.

Stockport Infirmary.—H.S. £150.

Tunbridge Wells, New Kent and Sussex Hospital.—Res. Surg. O. £250. Sen. H.S. £175. Second H.S. £150. Also Jun. H.S. £125.

Wales University.—Cecil Prosser Research Scholarship. £250.

Weir Hospital, Grove-road, Balham, S.W.—Jun. Res. M.O. £150.

West Bromwich, Hallam Hospital.—Res. H.P. At rate of £200.

Wigan Royal Infirmary.—H.S. At rate of £150.

Willesden General Hospital, N.W.—Cas. O. and H.S. Each at rate of £100. Also Clin. Assts. to Out-patients' Dept.

Wolverhampton Royal Hospital.—H.S. for Orthopædic and Fracture Dept. At rate of £100.

Woolwich and District War Memorial Hospital, Shooter's Hill, S.E.—H.P. and H.S. Each at rate of £100.

The Chief Inspector of Factories announces vacant appointments for Certifying Factory Surgeons at Carluke, Lanark; Warrington, Lancs; Torrington, Devon; and at Chesham, Bucks.

A vacancy for a Medical Referee under the Workmen's Compensation Act for the Great Malvern, Hay, Hereford, Ledbury, and Leominster County Court Districts is announced. Applications should be addressed to the Private Secretary, Home Office, Whitehall, London, not later than July 3rd.

Births, Marriages, and Deaths

BIRTHS

Heely.—On June 3rd, at Chudleigh, Devon, the wife of Dr. W. J. Heely, of a daughter.

Jamieson.—On June 8th, at Ventnor Villas, Hove, Sussex, the wife of A. M. de la M. Jamieson, M.B., Ch.B., of a son.

Panting.—On June 7th, the wife of L. J. Panting, B.Ch., St. Olaves, Bradford-on-Avon, of a daughter.

Roberts.—On June 3rd, at Staunton Lodge, Kingsbridge, Devon, the wife of Dr. W. H. Roberts, of a son.

MARRIAGES

Wandless—Rees.—On June 9th, at the Congregational Church, Witham, Essex, Denis J. Wandless, L.D.S., R.C.S. Eng., to Dorothy Mary Rees, daughter of the late Rev. J. Gilbert Rees and Mrs. W. J. Perry, of Little Braxted Hall, Essex.

Wicksteed—MacGregor.—On June 8th, at Carnwath, Lanarkshire, Dr. O. H. Wicksteed to Jean C. MacGregor, M.A.

Williamson—Madden.—On June 9th, at All Saints, Hove, James Charles Frederick Lloyd Williamson, F.R.C.S., to Helen Francis, third daughter of Captain and Mrs. C. H. Madden, of "Sussex Lodge," Shoreham.

DEATHS

Holford.—On June 11th, at "Ravensdene," Sutton, Surrey, Walter Stanley Holford, M.R.C.S., L.R.C.P., L.D.S., aged 67.

Twining.—On June 6th, at Wood End, Ryde, I.W., Vincent Wing Twining, M.B., C.M., late of Salcombe, S. Devon, in his 74th year.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

NOTES, COMMENTS, AND ABSTRACTS

FRACTURE OF THE NECK OF THE FEMUR

THE three-flanged nail designed by Smith-Petersen for accurate retention of the fragments in fracture of the neck of the femur is enjoying a large measure of popularity in surgical clinics almost throughout the world. The great advantages of the Smith-Petersen method as compared with other forms of internal splinting are first the very firm hold secured by the blades of the nail, which altogether prevents rotation of the fragments, and secondly the firm impaction obtained by hammering over the great trochanter with the nail already retaining the fracture in the reduced position. Dr. Thomas King, while aware of all these advantages, points out (Med. Jour. Australia, Jan. 6th, 1934, p. 5) that the wide exposure of the joint which has been found necessary by most surgeons for accurate introduction of the nail is the one great objection to its use. He has, therefore, in the University of Melbourne, worked out a technique by means of which the Smith-Petersen nail can be introduced with precision along the neck of the femur through the fracture and into the head of the bone by what is practically a subcutaneous operation. The essentials of the method are (*a*) that there should be complete reduction of the deformity, (*b*) that the vertical neck-shaft angle and the forward (or backward) torsion of the neck of the femur in the reduced position must be known before introduction of the nail, while (*c*) a nail is used which is pierced through its centre and is introduced by threading it along a wire previously inserted in the bone as a guide.

The reduction of the fracture takes place by traction on an orthopædic table, both lower limbs being fixed in extension, equally abducted at an angle of 60°–90°. External rotation is corrected by forward thrust of the greater trochanter by the hand, and the foot-piece is adjusted to maintain the corrected position. A Kirschner wire is introduced, with proper aseptic technique, 2 inches below the tip of the great trochanter and on its posterior aspect. It is pushed inwards close to the posterior aspect of the neck of the femur, midway between its upper and lower borders, until the end of the wire strikes the fracture site. Direct vision through a fluorescent screen is used to guide the wire at the correct level and to negotiate it past the fracture up to the acetabular rim. The wire thus introduced acts as an indication to the direction of the neck of the bone and to the angle at which it joins the shaft. A second wire is now introduced by the special drill used for inserting Kirschner wire, and is made to take the precise direction desired for the subsequent insertion of the nail. It is drilled into the bone about an inch further than the first wire, but not further at first than 4 inches, in case it should enter the pelvis. X ray pictures taken in two planes determine the direction and the depth of penetration of the wire. If necessary the wire can be drilled further, for it must obtain a good hold on the head of the bone.

If the position of the wire relative to the head and neck of the femur is satisfactory, the insertion of the nail is proceeded with. A starter (which is an abbreviated but strong nail) is first used to make the insertion of the Smith-Petersen nail easier, and to prevent damage to its blades. The starter is slipped off the wire and the nail slipped over. The depth of introduction is known from the length of wire previously used. Once the nail has entered the head of the bone, traction on the limb is relaxed, the Smith-Petersen impactor is slipped over the nail head, and its outer end is hit with gentle and repeated blows to drive the ends of the fracture into one another. The wound is sutured and the dressing secured with mastic gum. Weight extension of about 10 pounds is used with the limb supported on a sling or splint. At the end of six weeks the patient may walk on a calliper splint, or, alternatively, earlier weight-bearing may be allowed by the use of a short spica bandage of plaster-of-Paris round the pelvis and thigh. Seven patients have been treated by this special technique, but as a few weeks only had elapsed since operation no pronouncement is possible on its ultimate effect. Judging by the known success of internal fracture by the Smith-Petersen nail, a high proportion of good results is anticipated.

Mr. B. H. Burns has evolved a method similar in principle, and has used it in 12 cases (Proc. Roy. Soc. Med., March, 1934, p. 581). Three Kirschner wires are inserted through an incision over the outer aspect of the greater trochanter, each wire being passed through the neck into the head of the bone in what appears to the operator to be the most suitable direction. A radiogram is taken to show which wire is most accurately placed, and the Smith-Petersen nail is passed over the wire and driven home. The other wires are then extracted.

NATIONAL BABY WEEK COUNCIL

IN its annual report for 1933, the seventeenth year of its existence, the National Baby Week Council records an increase of activity and influence. Since baby shows appear to be gaining in popularity, it is satisfactory to learn that the majority of them are conducted in accordance with the Council's regulations, the chief of which is that judging must be carried out by medical practitioners well qualified in the examination of infants and young children. During the year for the first time the Council added a "talkie" to its list of films, bringing the total up to twelve. A display of propaganda films given in the Kingsway Hall was attended by 2500 people. The overseas work is one of the Council's most useful activities. Largely through the Imperial Baby Week Challenge Shield the movement is spreading to more and more parts of the Empire, and is including in its scope some of those remote districts peculiarly in need of education.

The special subject advocated for propaganda this year is "The Making of an A 1 Nation," with particular emphasis on the importance of good nutrition for expectant and nursing mothers, infants, and toddlers. Baby Week is, as usual, being celebrated in the first week of July, and the National Conference on Maternity and Child Welfare is to be held in the Town Hall, Birmingham, from July 3rd to 5th.

MENINGITIS DUE TO GÄRTNER'S BACILLUS

A CASE of purulent meningitis attributed to the *Bacillus enteritidis* of Gärtner is described by H. G. Rupert (Nederl. tijdschr. v. geneesk., 1934, lxxviii., 1763). The patient, aged three months, and previously healthy, was brought to hospital with a history of convulsions for one week, accompanied by fever. On examination it was found that Kernig's sign was strongly positive, the anterior fontanelle was bulging and tense, the reflexes were somewhat accentuated, the ears and throat normal. The temperature was normal, but after admission rose to 104·5°, remaining high until the fifth day, when death took place, shortly before which the temperature fell to 99°. The pulse-rate remained at about 160 throughout. Lumbar puncture showed that the cerebro-spinal fluid was under great pressure and turbid, and contained numerous polymorphonuclear leucocytes and masses of Gram-negative bacilli, which on further examination were found to be *B. enteritidis*. The same organism was grown from the fæces, but none were found in the blood or urine. The blood-serum was found to agglutinate the patient's own organisms in a dilution of 1 : 250, and another strain of Gärtner's bacillus in a dilution of 1 : 50. The fæces of the other members of the household were examined, but the organism was not discovered. The child's father was a butcher, and it is suggested that he, through being in contact with infected meat, may have been the source of the infection.

Gärtner's bacillus as a cause of suppurative meningitis was reviewed in our columns last November by Dr. F. H. Stevenson and Dr. L. K. Wells (THE LANCET, 1933, ii., 1084), who reported a case of their own. In many of the reported cases the condition has been preceded by some other manifestation such as cholecystitis or cystitis due to this organism. The exact path of infection in the present case remains obscure.

POST-GRADUATE OPPORTUNITIES IN HUNGARY

ON behalf of the Hungarian Medical Postgraduate Committee, Dr. Joseph Baló has sent us the third edition he has brought out of an official guide-book to the medical faculties of Hungarian universities and the public hospitals of Budapest. There are 4520 beds at the service of medical and postgraduate training, and in addition 21,534 hospital beds in large public hospitals where teaching and scientific work is also carried out. Prof. Emil de Grósz is president of the postgraduate committee, and all the teaching is conducted in English, German, or French. The universities which offer opportunities are at Budapest, Szeged, Pécs, and Debrecen; there is also the Apponyi Polyclinic and the hospital of the Jewish community of Pest. A few years ago three important medical institutions were opened almost at the same time: the Institute of Biological Research at Tihany, the State Hygiene Institute promoted with a grant from the Rockefeller Foundation, and the central hospital of the National Institute for Social Insurance. Foreign physicians are invited to call at the headquarters of the Hungarian Medical Postgraduate Committee, VIII. Mária-utca, 39, Budapest.

ROSE DE MAI

A RECENT editorial article upon Natural Perfumes (THE LANCET, June 2nd, p. 1181) aroused some doubt as to what plant is known as rose de mai, which the following information received from Monsieur Moutet answers. Rose de mai is imported from Bulgaria and the name is unlikely to be found in any dictionary. The hawthorn is useless from the point of view of the perfumer. A May scented rose perfume is obtained by the use of synthetic essences. The species of rose de mai used is *R. centifolia.*

LINES FROM A G.P.

Dr. JOHN WISHART writes: "If Dr. F. C. Nicholls gets a book called 'Life,' written—curious to say —by Dr. W. Nicholl, and published in *1841*, he will find therein the whole of 'Lines from a G.P.' It is also to be found, in full, in 'A Whiff of Old Times,' published by Wright of Bristol."

THE LÖWENSTEIN-JENSEN CULTURE MEDIUM.—Dr. Evelyn M. Holmes writes: "May I correct an erroneous impression given in the report of my remarks at the Congress of the Royal Institute of Public Health (THE LANCET, May 26th, p. 1139). I did not say that *sputum*, but pleural, ascitic, and other fluids, even urine on occasion, will give pure cultures on the medium I described for tubercle work without any previous treatment. It is possible that portions of purulent sputum would do so but I have never tried it. Such sputum would probably be microscopically positive and hence not call for culture, unless for the interest of typing."

SCHOOL OF DIETETICS.—The Royal Infirmary of Edinburgh is opening a new school of dietetics in September, 1934, and there are vacancies for students in September, 1934, and April, 1935. The course lasts two years for State-registered nurses and one and a half years for students with two years' domestic science training. It is expected that hospitals inaugurating dietetic departments will send selected nurses from their staff to attend the course. Particulars may be had from the lady superintendent of nurses at the infirmary.

Medical Diary

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

TUESDAY, June 19th.—5.30 P.M., General Meeting of Fellows.

THURSDAY.

Dermatology. 5 P.M. (Cases 4 P.M.) Dr. J. E. M. Wigley: 1. Prurigo. Sir Aldo Castellani: 2. Tinea Imbricata (Tokelau)—previously shown. Dr. Robert Klaber: 3. Sarcoid.

FRIDAY.

Obstetrics and Gynæcology. 8.15 P.M. Registrar's Pathological Meeting. Mr. David M. Currie: Cervical Myoma. Cæsarean Section: Myomectomy. Miss E. M. Shippam: Chorion Epithelioma of Uterus Clinically Simulating Ruptured Ectopic Pregnancy. Mr. John Beattie: Uterus and Ovaries Removed for Chorion Epithelioma on the Evidence of Aschheim-Zondek Reaction. Mr. David M. Stern: Pregnancy and Labour after Hypophysectomy with Reference to Aschheim-Zondek Reaction. Mr. Arthur C. Bell: Round-celled Sarcoma involving Cervix and Corpus Uteri and Fallopian Tubes. Mr. Douglas MacLeod: Botyroid Sarcoma of Cervix Uteri. Mr. R. K. Bowes: Bilateral Cortical Necrosis of Kidneys. Pregnancy Toxæmia. Mr. W. C. W. Nixon: Uterus. Hysterectomy for Conceale[illegible] rhage. Mr. W. R. Winterton: [illegible] a Fallopian Tube Implanted for [illegible]

SATURDAY.

Disease in Children. Summer Meeting at Oxford by invitation of Mr. G. R. Girdlestone. Train leaves Paddington 12.15 or 12.30 P.M. 2.20 P.M., Demonstration of medical and surgical cases at the Wingfield Morris Orthopædic Hospital. Return train arrives Paddington 7.28 P.M.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE, Manson House, 26, Portland-place, W.

THURSDAY, June 21st.—8.15 P.M., Annual General Meeting, followed by a paper by Dr. L. W. Hackett, Assistant-Director of the International Health Division, Rockefeller Foundation, on the Present Status of our Knowledge of the Races of *Anopheles maculipennis.* There will be a demonstration illustrating the subject at 7.45 P.M.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY, June 18th, to SATURDAY, June 23rd.—LONDON LOCK HOSPITAL, 91, Dean-street, W. Afternoon Course in Venereal Disease.—PRINCE OF WALES'S HOSPITAL, Tottenham, N. All-day Course in Medicine, Surgery, and the Specialties.—MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W. Lecture-demonstration on Renal Insufficiency, at 2.30 P.M., on Tues. by Dr. Clark-Kennedy.—PANEL OF TEACHERS. Individual clinics in various branches of medicine and surgery are available daily. Courses of instruction, clinics, &c., arranged by the Fellowship of Medicine are open only to Members and Associates.

NATIONAL TEMPERANCE HOSPITAL, Hampstead-road, N.W.

THURSDAY, June 21st.—9 P.M., Dr. Robert Hutchison: Praise and Dispraise of Doctors. (Macalister Lecture.)

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE, Hammersmith, W.

Daily, 2 P.M., Medical and Surgical Clinics, Operations.

MONDAY, June 18th.—10 A.M., Medical Wards. Pathological Demonstration. 11 A.M., Surgical Wards. 2 P.M., Gynæcological and Surgical Wards, Eye and Gynæcological Clinics.

TUESDAY.—10 A.M., Medical Wards. 11 A.M., Surgical Wards. 2 P.M., Throat, Nose, and Ear Clinic. 4.15 P.M., Lecture, Mr. Green-Armytage: Sterility.

WEDNESDAY.—10 A.M., Medical and Children's Wards, Children's Clinic. 2 P.M., Eye Clinic.

THURSDAY.—10 A.M., Neurological and Gynæcological Clinics. 11.30 A.M., Fracture Demonstration. 2 P.M., Eye and Genito-urinary Clinics.

FRIDAY.—10 A.M., Skin Clinic. 12 noon, Lecture on Treatment. 2 P.M., Throat Clinic. 4.15 P.M., Lecture, Dr. Owen, The New-Born Infant.

SATURDAY.—10 A.M., Medical and Surgical Wards, Children's and Surgical Clinics. The lectures at 4.15 P.M. are open to all medical practitioners without fee.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION, St. James' Hospital, Ouseley-road, Balham.

WEDNESDAY, June 20th.—4 P.M., Mr. V. Z. Cope: Demonstration of Surgical Cases.

UNIVERSITY OF BIRMINGHAM.

TUESDAY, June 19th.—3.30 to 5 P.M. (at the General Hospital), Mr. Beatson Heard: Demonstration of Ophthalmic Cases.

FRIDAY.—3.30 to 5 P.M. (at the Queen's Hospital), Mr. J. N. Sankey: Demonstration of Physiotherapeutic Measures in Surgical Cases.

LEEDS GENERAL INFIRMARY.

TUESDAY, June 19th.—3.30 P.M., Dr. Moll: Demonstration of Medical Cases.

ADDRESSES AND ORIGINAL ARTICLES

PRAISE AND DISPRAISE OF DOCTORS[*]

BY ROBERT HUTCHISON, M.D., F.R.C.P. Lond.
CONSULTING PHYSICIAN TO THE LONDON HOSPITAL

WE are met to perpetuate the memory of Sir John MacAlister. Although not himself a medical man MacAlister did a great work for our profession by the leading part he took in the amalgamation of the scattered medical societies of London into the great unit now known as the Royal Society of Medicine, and it is most just that we should hold his name in grateful remembrance. But MacAlister was a librarian before he became secretary to the new Society which he brought into being, and to the end of his life he was keenly interested in literature. It is perhaps not inappropriate, therefore, that I should have chosen for this lecture a subject which belongs more to the domain of letters than to that of medicine —namely, a consideration of "Praise and Dispraise of Doctors" throughout the ages. It might be thought that this is an otiose task; but I hope to be able to show that it is justified, for it is always interesting, and may be amusing, to see ourselves through the eyes of others. It is instructive also, and possibly corrective, to learn what, in the opinion of the laity, are our chief faults and what our virtues and merits.

Medical Proverbs

We may begin by glancing at the things said about doctors and their work in popular proverbs. One must not, of course, take proverbial wisdom too seriously, for it is easy to quote proverbs that are mutually contradictory, but none the less a proverb usually embodies one aspect of truth, or what the populace from its experience believes to be the truth, for otherwise it would never have obtained general currency. Now the healing art and its practitioners come home so much to the business and bosoms of men that there are naturally many medical proverbs A collection of them was published[1] some years ago and several are to be found in any dictionary of phrases, most of them, I regret to say, uncomplimentary. Here are a few examples taken from various countries :—

> He who has killed a thousand persons is half a doctor.—(*Tamil proverb.*)
>
> When you call the physician, call the judge to make your will.—(*German.*)
>
> The doctor is often more to be feared than the disease.—(*French.*)
>
> If the doctor cures the eye sees it ; if he kills, the earth hides it.—(*Scottish and Portuguese.*)
>
> God heals, and the physician hath the thanks.—(*Old proverb.*)

These, it will be observed, bring against doctors the accusation which we shall find to be very common throughout the ages: that they kill more than they cure, and that when a patient does recover it is Nature that deserves the credit. On the other hand, as showing the contradictory nature of proverbs, we have this : "A half doctor near is better than a whole one far away." More in harmony with professional views is the French and Italian saying, "A surgeon should be young ; a physician old," and it might well be considered when fixing the retiring age for medical and surgical members of a hospital staff. As a corollary to it we find : "A young physician makes a lumpy churchyard"—but as to what an old surgeon makes proverbial wisdom is silent. The most sweeping condemnation, however, is the saying in the Talmud, "The best of doctors is ripe for Hell." There is nothing half-hearted about this, and I had hoped that it really referred to doctors of the Law, but I am told by my learned friend, Dr. W. M. Feldman, that it is indeed medical doctors who are thus denounced.

The Ancient Writers

Proverbs are usually anonymous—the wisdom of many, as it has been said, embodied in the wit of one—and belong to no particular age or country ; but I turn now to the considered opinions expressed by writers of more or less eminence, mostly laymen, at different periods of history. We may begin with the Ancients, meaning by that those who wrote before the fall of the Roman Empire. Even in the earliest writings mention is to be found of the doctor and his work, but so long as the functions of the priest and the physician were more or less identical criticism was probably restrained by motives of piety or of prudence. In the Scriptures there are but few references to medicine, although we have the well-known panegyric of Jesus, the son of Sirach, in *Ecclesiasticus* : "Honour a physician with the honour due unto him. . . The skill of the physician shall lift up his head : and in the sight of great men he shall be in admiration. Then give place to the physician for the Lord hath created him," and so on. But even here one finds a sting at the end : "He that sinneth before his Maker let him fall into the hand of the physician." Then there is that poignant verse in St. Mark about the woman with an issue of blood which is as true of many patients to-day as it was 2000 years ago : "And had suffered many things of many physicians, *and had spent all that she had,* and was nothing better but rather grew worse," an oblique condemnation of our profession which might well be pondered by the gynæcologists. But it is to the classical writers of Greece and Rome that we must chiefly look for criticism, for it was only after the rise of Greek medicine that the physician began to attract much attention. Four centuries before Hippocrates, however, one finds Homer paying us a handsome compliment in the lines (I quote from Pope's translation) :—

> A wise physician skill'd our wounds to heal,
> Is more than armies to the public's weal.

Æsop (c., 570 B.C.), on the other hand, in some of his fables is decidedly disparaging, and Heraclitus (6th Century B.C.) goes so far as to say that "*if the doctors are excepted*—there is no one more stupid than the grammarian." Menander (342–290 B.C.), too, makes a shrewd hit when he exclaims, "A prattling physician is another disease to a sick man !" The same might be said with even more truth nowadays of a prattling nurse. Philemon (360–262 B.C.) brings against doctors a charge which the laity are never tired of repeating : "Doctors order for their patients a strict régime ; when they themselves are ill in bed they do everything that they have forbidden to others," and Mimnermos (7th Century B.C.) has an interesting comment on prognosis : "There are doctors who to show their worth and to be sure of an excuse make bad seem worse and of the worse make a disaster," which, it is to be feared, is true of some of us even to-day.

Plato (429–347 B.C.) has not much to say about medicine, but he speaks of "the wise physician who is worth many another man," and expresses the curious opinion that doctors "had better not be in robust health, and should have had all manner of diseases in their own persons," a dictum for the second part of which there is more to be said than for the first. In the Greek Anthology, a collection which covers nearly fifteen centuries, there are many medical epigrams, some laudatory others satirical, but their praise and dispraise mostly refers to individuals and not to the profession as a whole, so they need not be quoted here. They have been carefully studied by Dr. J. D. Rolleston.[2]

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[*] The eighth annual MacAlister Lecture delivered at the National Temperance Hospital on June 21st.

[1] Brit. Med. Jour., 1911, ii., 1482.

Roman writers are more bitter in their comments than the Greeks. The reason for this no doubt was that at the time of the Early Empire most of the physicians in Rome were Greeks whom the Romans despised, and who were not only ignorant but apt to give themselves airs. Their nationality led to the whole profession being looked down upon, just as in the Middle Ages doctors were often despised because so many of them were Jews. It must be remembered, too, that a large number of the Greek physicians in Rome belonged to the slave class. The elder Pliny (A.D. 23–79), particularly, had almost as great a "down" upon doctors as Petrarch had thirteen centuries later. In his Natural History,[3] Pliny speaks of the profession as follows :—

> The art of Physicke hath this peculiar gift and priviledge alone, that whosoever professeth himselfe a Physitian, is straitwaies beleeved, say what he will and yet to speak a truth, there are no lies dearer sold or more dangerous than those which proceed out of a Physitian's mouth.
>
> There is no law or statute to punish the ignorance of blinde Physitians, though a man lost his life by them: neither was there ever any man known, who had revenge or recompence for the evill intreating or misusage under their hands. They learne their skill by indangering our lives; and to make proofe and experiments of their medicines, they care not to kill us. In a word, the Physitian only, if he murder a man, so clear he goeth away with impunity, that none so hardy as once to twit or challenge him for it: but say that one be so bold as to charge them with any untoward dealing; out they cry presently upon the poor patients, they are found fault with their unrulinesse, distemperature, wilfulnesse, and I know not what: and thus the sillie souls that be dead and gone, are shent (put upon their trial), and bear away the blame.
>
> But for these Physitians, who are the judges themselves to determine of our lives, and who many times are not long about it, but give us a quick dispatch and send us to heaven or hell; what regard is there had, what inquiry and examination is made of their quality and worthiness ?
>
> Is there any trade or occupation goeth beyond it for poisoning ? What is the cause of more gaping and laying wait after wills and testaments, than this ? What adulteries have beene committed under the colour hereof, even in Princes' and Emperors' palaces ?
>
> I mean not to say ought of their extreme avarice ; of the merchandise, spoile, and havocke that they make when they see their patients in danger of death, and drawing to their end ; nor how high they hold (as it were in open market) the easement and releafe of the sicke man's pains, whiles he is under their hands ; ne yet what pawnes and pledges they take as earnest of the bargaine, to dispatch the poore Patient out of the way at once ; and lastly, of their hidden secrets and paradoxes, which forsooth they will not divulge abroad, but for some round summe of money.

There is no reason to doubt that these strictures were deserved by many of the doctors of his day. Martial and Juvenal, also, often exercised their wit at the expense of the profession. It is unnecessary to quote from them, but I should just like to mention one of Martial's epigrams as it shows that clinical clerks were much the same in the first century as they are now :—

> I'm ill. I send for Symmachus ; he's here,
> An hundred pupils following in the rear :
> All feel my pulse, with hands as cold as snow :
> I had no fever then—I have it now.

Quintilian (A.D. 40–118) had no faith in doctors and says that medicine "serves only to keep us hopeful." He advises his readers to "put no trust in the hopes of physicians." His contemporary, Petronius Arbiter, thought, as many have done since, that a "physician is but a consoler of the mind." Plotinus (205–270) is more sweeping when he denounces medicine as "the chief of errors," whilst Flavius Valens (328–378) contents himself with the simple recommendation: "Keep the physician from your door as long as you can."

Mediaeval Criticisms

After the fall of the Roman Empire in 476 came the Dark Ages which lasted for a thousand years. It was a time during which medicine made little progress, though in justice it must be remembered that it saw the foundation of the great Medical School of Salerno and the establishment of the first rudimentary hospitals for the sick. There was an improvement in the knowledge of drugs due to the Arabians, but Roger Bacon (1214–1294) would not even admit this of the practitioners of the day, for he says [4] that "medical men are ignorant of simple medicine and at the mercy of apothecaries. In compound medicine they go entirely astray. . . They don't learn to know the drugs they use nor their prices."

The qualified "leech" of the Middle Ages was certainly not a safe doctor. His knowledge, such as it was, was derived almost entirely from Arabian commentaries on the writings of Hippocrates and Galen and he had little or no practical training. A portrait of what was probably a favourable specimen of the profession is drawn by Chaucer in his well-known description of the "Doctur of Phisik" in the "Prologue to the Canterbury Tales," the chief features in the picture being the doctor's belief in astrology, his knowledge of the classical and Arabian authors, his spare but nourishing and digestible diet, his scepticism ("his studie was but litel on the Bible"), his fine dress, and his love of money. For a balanced opinion from a cultured layman about doctors in the 12th century we may go to John of Salisbury (1118–1180):—

> The theoretical physicians do what concerns them, and for love of you will even go further. You can get from them information as to the nature and causes of particular phenomena, they are judges of health, of sickness, and of the mean state. Health, so far as words go, they provide and preserve, and as concerning the mean state they bid one incline in the direction of health. Of sickness they foresee and declare the causes, and lay down its beginning, its continuance, and its decline. What more shall I say ? When I hear them talk I fancy that they can raise the dead and are in no way inferior to either Æsculapius or Mercury.
>
> And yet with all my admiration I am much troubled at one matter, and that is they are so singularly at variance in their discussions and in the opinions which are drawn from them. For this one thing I do know, that contraries cannot both be true at the same time.
>
> Again, what shall I say about the practising physicians ? God forbid that I should say anything bad about them ! since for my sins I fall only too often into their hands. They should rather be soothed by politeness than angered by words, and I do not wish that they should treat me hardly, nor could I endure all the evils about which they

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[2] Proc. Roy. Soc. Med., 1914, vol. vii. (Sect. of History of Medicine), pp. 3–13 and 30–56.

[3] Book XXIX. Chap. I. Trans. Philemon Holland.

[4] De Erroribus Medicorum, trans. A. G. Little.

> constantly talk. I would rather say with blessed Solomon "All medicine is from the Lord, and he that is wise will not despise it."
>
> Nor is anyone more useful or more necessary than the physician so that he be faithful and full of foresight. For who can say enough in his praise who is the craftsman of health and the begetter of life in that he takes after the Lord and stands in his place, for that health which the Lord gives as a Prince, the physician, as steward and minister, administrates and dispenses.
>
> It is of little moment if some physicians sell an imaginary benefit, and that they may appear the more honest take no fee before the patient is well. But such are dishonest in that they give themselves the credit for a recovery which is due to time, or rather to the gift of God; for it is due to God and to the natural powers of his constitution that the sick man is raised up. Few are they who act in this way, for you will always hear physicians advising one another as follows:—"Take your fee while the patient still feels ill."
>
> Perhaps you look for me to say, what the common people say, that physicians are the class of people who kill other men in the most polite and courteous manner. Well, you will be disappointed; God forbid that I should do them this injury!

The *popular* opinion two centuries later was expressed succinctly by William Langland (?1330–1400) in Piers the Plowman:—

> For mortherers aren mony leches
> Lorde them amende!

whilst the view of the learned is given by Poggio Bracciolini (1380–1459), when he says flatly in his "Disputation upon the Law and Medicine": "Jurisprudence and Medicine have this in common that they are humiliating to contemplate."

The most violent mediaeval opponent of medicine, however, was Petrarch, who paid the profession the compliment of devoting four books of invectives to it. I quote from a letter to the Pope which formed the preface to the first of these books [5]:—

> I know that your sick bed is continually besieged by physicians, a fact which is my chief cause of terror, for they disagree of set purpose, and even he who can bring forth nothing new is ashamed to follow in the footsteps of another.
>
> Neither is there any doubt (as Pliny gracefully says) that they are always hunting after renown for some novelty and so traffic in our lives. Also in this art alone does it happen that a man is taken at his own valuation, and that anyone who holds himself out as a physician is at once accepted as such; but although in no form of fraud is there greater danger, yet we do not regard it, so great is the attraction of a man's own particular delusion. Besides, there is no law to punish human ignorance, no exemplary capital penalty; they learn by our danger and gain experience through our death. The physician alone can kill a man with absolute impunity.
>
> Therefore I implore you, choose one out of the many who surround you, not on account of his eloquence, but as being conspicuous for his knowledge and trustworthiness; for now, forgetful of their own profession, they have dared to come forth from their lairs and seek the grove of the poet and the rhetorician's field of action, and, not with any idea of healing, but merely to gain a dialectical advantage, they surround the beds of our unhappy sick and dispute with mighty bellowings. But my pen has carried me far beyond the limits which I had set myself, so let me here make an end, by telling you to shun the physician who is eminent not for his knowledge, but solely for his powers of speech, as you would a lurking assassin or a poisoner.

The last sentence reminds one of Osler's dictum that there are only two kinds of doctors—those who practise with their brains and those who practise with their tongues.

In another letter the Italian poet says [6]:—

> A celebrated doctor said one day in my presence: "In detracting from the art to which I am indebted for so much wealth and so many clients, I know that I lay myself open to be called ungrateful, but truth must be upheld before everything else. I believe and I frankly say and maintain that, if a hundred or a thousand people, all of the same age, of the same constitution and habits, were suddenly seized by the same illness, and one half of them were to place themselves under the care of doctors, such as they are in our time, whilst the other half intrusted themselves to Nature and to their own discretion, I have not the slightest doubt that there would be more cases of death amongst the former, and more cases of recovery among the latter." Another doctor, even more famous and learned, with whom I had one day a confidential talk, candidly and prudently answered my question why he did not abstain from the food he forbade others, by saying: "My friend, if a doctor did himself what he advises others to do or bade them do the same as he does, he would either suffer in health or in estate."

It will be evident from all this that our profession was not very popular, and probably deservedly not, throughout the Middle Age.

Renaissance Views on Medicine

With the rebirth of learning in the middle of the 15th Century there came fresh criticism of the ignorance of many doctors, and the Renaissance writers found in the profession a ready butt for their agile wit. Erasmus (1452–1536), however, as was natural in a friend of Linacre, has some complimentary things to say:—

> Antiquity rightly both believed and proclaimed that no reward worthy enough can be paid to a skilled and trustworthy doctor.
>
> The theologian makes men repent of their sins, but it is owing to the doctor that there is anyone to repent. It is vain to be a physician of souls if the soul for whom the antidote was prepared has already fled.
>
> We owe gratitude to those who drive off the enemy who flies at our throats; are we not more indebted to the doctor who fights daily for our safety against forces hostile to life?—(*Declamatio in laudem artis medicae.*)

Savonarola also is kindly, but it is well known that he had little sympathy with the Renaissance spirit:—

> The physician that bringeth love and charity to the sick, if he be good and kind and learned and skilful, none can be better than he. Love teacheth him everything, and will be the measure and rule of all the measures and rules of medicine.

There are in Montaigne's (1533–1592) Essays many references to Medicine and doctors which show on the whole his broad tolerance. I quote from Florio's translation:—

> As for me, I honour physitians, not according to the common received rule, for the necessitie sake (for to this passage another of the prophets may be alleaged who reprooved King Asa; because he had recourse unto physitians) but rather for love I beare unto themselves; having seene some, and known diverse honest men amongst them, and worthy all love and esteeme. It is not them I blame, but their arte; yet doe I not greatly condemne them for seeking to profit by our foolishnesse (for most men do so) and it is a thing common to all worldlings.—(*Of the Resemblance between Children and Fathers.*)

He repeats, however, the old gibe that doctors don't practise what they preach:—

> So do our Physitians, who, whilst they tie their patients to a strik't diet of a panada or a sirope, feed themselves upon a melone, dainty fruits, much good meat, and drinke all maner of good Wine.—(*Of Vanitie.*)

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[5] John of Gaddesden: H. P. Cholmeley. Oxford, 1912.

[6] Thoughts from the Letters of Petrarch. Trans. J. Lohse, London, 1901.

To this period also belongs the delightful and often-quoted Latin epigram attributed to Euricius Cordus (f.l. 1525) which expresses what perhaps patients always think of their doctors though they do not always say it :—

> "Three faces the Phisition hath ;
> First as an Angell he,
> When he is sought ; next when he helps,
> A God he seems to be ;
> And last of all, when he has made,
> The sicke, diseased, well,
> And asks his guerdon, then he seems
> An oughly Fiend of Hell."

The following description of a fashionable surgeon of the 16th Century by William Clowes (1540–1604), himself surgeon to Queen Elizabeth and to St. Bartholomew's, is amusing, and some features of the portrait are recognisable even to-day :—

> Then riseth out of his chair, fleering and jeering, this miraculous surgeon, gloriously glittering like the man in the moon, with his bracelet about his arms, therein many precious jewels and stones of Saint Vincent his rocks, his fingers full of rings, a silver case with instruments hanging at his girdle, and a gilt *spatula* sticking in his hat, with a rose and crown fixed on the same, standing upon his comparisons, and said unto me that he could open the wound, and if it were before my face : for (said he) my business lieth not in London, but abroad in the country, and with such persons that I cannot or will not tarry for you nor for no other whatsoever. And now here he did begin to brag and boast as though all the keys of knowledge did hang at his girdle.—(*A Proved Practise for all young Chirurgeons.*)

The Elizabethan dramatists have, as was to be expected, many references to doctors in their plays, but as these have recently been collected by Mr. Macleod Yearsley [7] I need not quote any. Most of them are abusive, although Shakespeare, as Mr. Yearsley points out, usually took a more sympathetic view. Thomas Dekker (1570–1641) adopts an ambiguous attitude. In his plays he could show as much animus against the medical profession as any of his contemporaries, and yet in his Plague Pamphlets there is to be found one of the most beautiful metaphors about a doctor ever penned :—

> Make much of thy Physitian : *let not an Emperick or* Mounti-bancking Quacksalver peepe in at thy window, but set thy Gates wide open to entertaine thy learned Physitian : Honour him, make much of him. Such a Physitian is God's second, and in a duell or single fight (of this nature) will stand bravely to thee. A good Physitian comes to thee in the shape of an *Angell*, and therefore let him boldly take thee by the hand, for he has been in God's garden, gathering herbes : and soueraine rootes to cure thee ; A good Physitian deales in simples, and will be simply honest with thee in thy preservatio.

From the more serious Elizabethan writers one may select three well-known criticisms of Francis Bacon (1561–1626) in the "Advancement of Learning," all of which are more or less applicable to the present day :—

> (1) Medicine is a science which hath been (as we have said) more professed than laboured, and yet more laboured than advanced ; the labour having been, in my judgment, rather in circle than in progression. For I find much iteration, but small addition.
>
> (2) I esteem it the office of a physician not only to restore health, but to mitigate pain and dolors ; and not only when such mitigation may conduce to a fair recovery, but when it may serve to make a fair and easy passage. . . . But the physicians contrariwise do make a kind of scruple and religion to stay with the patient after the disease is deplored ; whereas in my judgement they ought both to enquire the skill, and to give the attendances, for the facilitating and assuaging of the pains and agonies of death.

(It is still difficult to persuade doctors not to strive officiously to keep alive.)

> (3) Physicians are some of them so pleasing and conformable to the humour of the patient as they press not the true cure of the disease.

Finally, it is interesting to know, on the authority of Sir Theodore Mayerne (1573–1655), that James I. himself had but a poor opinion of doctors. "The King," says Mayerne, "laughs at medicine and holds it so cheap that he declares physicians to be of very little use and hardly necessary. He asserts the art of medicine to be supported by mere conjectures and useless because uncertain."

Seventeenth Century Writers

By the seventeenth century much of the effervescence of the Renaissance had passed off, whilst the dawn of modern medicine had begun with the introduction of the experimental method by Harvey and the re-establishment of clinical observation by Sydenham. Criticism now becomes graver and more serious in accordance with the spirit of the time, whilst there is greater readiness to acknowledge the virtues of the doctor and to excuse his failings ; dispraise, however, is still commoner than praise.

Throughout the century there was a passion for the analysis of human minds and motives, and this often led to the publication of what were called "characters," composite pictures, as it were, of different types of men, although as a rule touching mostly on their passing and accidental aspects. A good example is John Earle's "Microcosmographie" (1628), which contains amongst many other "characters" one entitled "A Meere Dull Physician." It is too long to quote in full, but is entirely malevolent, and the only excuse for Earle is that he wrote it when still very young. The general tone may be gathered from one sentence : "The best cure he (the Physician) has done is upon his own purse, which from a lean sickliness he hath made lusty and in flesh." He has also a "character," styled simply and more politely "A Surgeon," of whom he says (amongst many other sarcasms) that "his gains are very ill-got, for he lives by the hurts of the common-wealth. He differs from a physician as a sore does from a disease or the sick from those that are not whole, the one distempers from within, the other blisters from without. . . . . The rareness of his custom makes him pitiless when it comes : and he holds a Patient longer than our Courts a Cause," and so on.

Thomas Fuller (1608–1661), the contemporary of Earle, is much more sympathetic in his picture of "The Good Physician" [8] of whom he says :—

> Coming to his patient he persuades him to put his trust in God, the foundation of health.
>
> He hansells not his new experiments on the bodies of his patients, letting loose mad recipes into the sick man's body. . . . .
>
> To poore people he prescribes cheap but wholesome medicine, not removing the consumption out of their bodies into their purses.
>
> He brings not news with a false spie that the coast is clear till death surprises the sick man. When he can keep life no longer in, he makes a fair and easy passage for it to go out. . . . .

And more in the same laudatory strain.

To surgeons he is equally kind.[9] "Necessary and ancient," he says, "their profession, ever since man's body was subject to enmity and casualty," and ends by "wishing unto them the three requisites for their practise, an Eagle's eye, a Ladies hand and a Lion's heart."

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[7] Doctors in Elizabethan Drama. London, 1933.

[8] The Holy State.

[9] History of the Worthies of England. Chap. IX.

Robert Burton (1577–1640) is another classical author of the period, whose references to doctors and medicine are always in terms of praise whilst he reserves blame for those whom he terms "mountebanks, quack-salvers and empiricks."

The seventeenth century writer who was most witty and satirical at the expense of doctors was, of course, Molière, but his plays do not lend themselves well to brief quotation and are moreover very well known.

The Eighteenth Century

The eighteenth century was the age of "reason" when all established beliefs and customs were subjected to criticism from which the medical profession did not escape. Nor can it be denied that criticism was often deserved. The profession at this time was divided into three classes—physicians, surgeons, and apothecaries. Of these the physicians and surgeons were for the most part well educated and, indeed, often learned men, but their practice left much to be desired, for in spite of the progress of the seventeenth century medicine almost stood still for more than two generations, and even up to the end of the eighteenth bleeding, blistering, purging, and polypharmacy were the chief weapons in the physicians' armoury. Their manners also were open to attack, for it was an age of medical pomposity and pedantry, of full-bottomed wigs, snuff-boxes, and gold-headed canes. Voltaire's witticisms were not without point when he defined a physician as "one who pours drugs of which he knows little into a body of which he knows less," and when he said that "the art of war is like that of medicine, murderous and conjectural."

The opinions on doctors and medicine expressed by the intellectuals or "wits" of the century are much divided; some are full of contempt, others of the highest praise. Horace Walpole (1717–1797), for instance, writes: "I abhor physicians." "By quack I mean impostor not in opposition to but in common with physicians." "In physicians I believe no more than in Divines," and much more in the same strain. Lady Mary Wortley Montagu (1689–1762) is not much kinder, for she accuses doctors of opposing inoculation because small-pox brought them so much money, and speaks of "a world of filthy doses and more filthy doctors' fees." On the other hand, Pope (1688–1744), who was not over given to commendation, said of physicians that they were in general "the most amiable companions and the best friends as well as the most learned men" he knew. The highest praise, however, comes from Samuel Johnson, who counted many physicians amongst his friends:—

> Medicine is a profession which must, undoubtedly, claim the second place amongst those which are of the greatest benefit to mankind.
>
> Every man has found in physicians great liberality and dignity of sentiment, very prompt effusion of beneficence and willingness to exert a lucrative art where there is no hope of lucre.
>
> They (doctors) do more good to mankind without a prospect of reward than any profession of men whatever.

His criticisms are comparatively mild:—

> Life is not to be sacrificed either to an affectation of quick discernment or of crowded practice, but may be required, if trifled away, at the hand of the physician.
>
> How many men in a year die through the timidity of those they consult for health.

Addison is inconsistent, for in the *Spectator* he writes:—

> If . . . we look into the profession of physic, we shall find a most formidable body of men. The sight of them is enough to make a man serious, for we may lay it down as a maxim, that when a nation abounds in physicians, it grows thin of people.

But in the *Tatler* we find him (or Steele) saying:—

> There is not a more useful man in a commonwealth than a good physician . . . he uses his skill with generosity even to persons of condition, and compassion to those in want: which is the behaviour of Hippocrates, who shows as much liberality in practice, as he does wit in his conversation, and skill in his profession. A wealthy doctor, who can help a poor man, and will not, without a fee, has less sense of humanity than a poor ruffian, who kills a rich man to supply his necessities. It is something monstrous, to consider a man of liberal education tearing out the bowels of a poor family, by taking for a visit what would keep them a week. Hippocrates needs not the comparison of such extortion to set off his generosity; but I mention his generosity to add shame to such extortion.

Other eulogists are Blackstone (1723–1780) who wrote in his Commentaries: "The medical profession, beyond all others, has remarkably deserved the character of general and extensive knowledge," and Samuel Parr (1747–1825), the Whig Johnson, who thought that of the three learned professions "in erudition, in science and in habits of deep and comprehensive thinking, the pre-eminence must be assigned in some degree to physicians."

Passing to lighter comments of the century one must quote the well-known epigram which has been attributed to Samuel Garth (1661–1719), himself a physician, but also to Joseph Jekyll (1752–1837), the wit and politician, as well as to others. Of the various forms of it I prefer the following:—

> See, one physician, like a sculler, plies,
> The patient lingers and by inches dies,
> But two physicians, like a pair of oars,
> Waft him more swiftly to the Stygian shores.

Henry Fielding (1707–1754) makes a hit when he says, "Every physician almost, hath his favourite disease," and everyone will agree with Swift (1667–1745) that "no man values the best medicine if administered by a physician whose person he hates or despises."

Hannah More (1745–1833) was, perhaps, reflecting more upon patients than upon doctors when she "used to wonder why people should be so fond of the company of their physician, till she recollected that he is the only person with whom one dares to talk continually of oneself, without interruption, contradiction or censure."

Finally, we get this sly dig from James Townley (1714–1778), the author of "High Life below Stairs."

> Wonderful is the skill of a physician; for a rich man he prescribeth various admixtures and compounds, by which the patient is brought to health in many days at an expense of fifty pounds; while for a poor man for the same disease he giveth a more common name, and prescribeth a dose of oil, which worketh a cure in a single night charging fourpence therefor.

The Moderns

From the middle of the nineteenth century down to the present day the progress of medicine has been so remarkable and its benefits to the community so conspicuous that many of the old gibes at doctors have lost their point and are only repeated, if at all, in jest. Praise, therefore, amongst modern writers is found to be commoner than dispraise, and criticism is reserved more for the manners and customs of the profession as a whole than for its practice or morals. From the immense mass of modern literature one can only select a few representative opinions, and these almost entirely from writers in this country.

There is curiously little to be gleaned from the great novelists of last century. Scott gives a charming picture of a country surgeon in Gideon Gray, but except when he says that doctors are "bad guessers" he makes almost no general criticisms. Dickens has very little to say about Medicine; his strictures were reserved for the Law. Thackeray has a few references to doctors in the "Book of Snobs," which are favourable although inclined to be patronising. George Eliot, in "Middlemarch," depicted with great skill and humour different types of practitioner, but, like Scott, refrains from general praise or blame except when she says: "it is seldom a medical man has true religious views—there is too much pride of intellect."

The following passage—it can scarcely be called criticism—from Trollope's "Doctor Thorne" is amusing:—

> A physician should take his fee without letting his left hand know what his right hand was doing; it should be taken without a thought, without a look, without a move of the facial muscles; the true physician should hardly be aware that the last friendly grasp of the hand had been made more precious by the touch of gold.

Of the opinions of politicians we may take three, dating from the early nineteenth, late nineteenth, and early twentieth century respectively.

> Lord John Russell (1792–1878): I admire the habits of a physician; he sees the weakness of our nature; he is generally just and conscientious, though somewhat selfish; from the contempt which his profession must give him of mankind, his mind is rather accurate than exalted.
>
> Lord Salisbury (1830–1903): Doctors are a social cement.
>
> Mr. Lloyd George: While I was dealing with the Insurance Act I had much to do with doctors. I found them unreasonable and unruly.
>
> The doctors are always changing their opinions. They always have some new fad.

Ruskin's tribute to the profession in the "Crown of Wild Olives" is well known:—

> So of doctors. They like fees, no doubt—ought to like them; yet if they are brave and well-educated, the entire object of their lives is not fees. They, on the whole, desire to cure the sick; and—if they are good doctors, and the choice were fairly put to them—would rather cure their patient and lose their fee, than kill him and get it.

And here is a selection of *obiter dicta* by various writers arranged roughly in chronological order:—

> He is the best physician who is the best inspirer of Hope.—*S. T. Coleridge* (1772–1834).
>
> A physician ought to be extremely watchful against covetousness; for it is a vice imputed, justly or unjustly, to his Profession.—*Thomas Gisborne* (1758–1846).
>
> The sixth commandment is suspended by one medical diploma from the North of England to the South.—*Sydney Smith* (1771–1845).
>
> Doctors are generally dull dogs.—*John Wilson* ("Christopher North") (1785–1854).
>
> This is where the strength of the physician lies be he a quack, a homœopath or an allopath. He supplies the perennial demand for comfort, the craving for sympathy that every human sufferer feels.—*Tolstoy* (1828–1910).
>
> A physician's physiology has much the same relation to his power of healing as a cleric's divinity has to his power of influencing conduct.—*Samuel Butler* (1835–1902).
>
> Doctors are the only autocrats we have left.—*E. F. Benson*.
>
> No one appreciates the medical profession more highly than myself. Doctors are the most generous of men; but they are unwise when they represent doctoring either as an art or a science. The late Dr. Jowett once said that logic "was neither a science nor an art, but a dodge," and doctors would be better appreciated if they would frankly admit that doctoring is like logic.—*Anonymous Author of More from a Lawyer's Notebook*. 1933.
>
> On the whole the doctors I have known have been amongst the finest men of my acquaintance. I have found them the kindest and wisest friends . . . . their generosity far surpasses what I have found in any other profession.—*Dean Inge.*

I should like to quote Mr. Kipling's very eloquent praise of the medical profession in the Address which he gave some years ago at the Middlesex Hospital but time does not permit, so I shall conclude these excerpts with Robert Louis Stevenson's charming Dedication in "Underwoods."

> There are men and classes of men that stand above the common herd: the soldier, the sailor, and the shepherd not unfrequently; the artist rarely; rarelier still, the clergyman; the physician almost as a rule. He is the flower (such as it is) of our civilisation; and when that stage of man is done with, and only remembered to be marvelled at in history, he will be thought to have shared as little as any in the defects of the period, and most notably exhibited the virtues of the race. Generosity he has, such as is possible to those who practise an art, never to those who drive a trade; discretion, tested by a hundred secrets; tact, tried in a thousand embarrassments; and what are more important Heraclean cheerfulness and courage. So it is that he brings air and cheer into the sick-room, and often enough, though not as often as he wishes, brings healing.

The Conclusion of the Whole Matter

Glancing back over the ground which we have now traversed we shall be convinced, I think, of the truth of the saying of an American writer, Charles L. Dana, that "all the real, solid, elemental jests against doctors were uttered some one or two thousand years ago." For medical satire and dispraise throughout the ages have always been much of the same kind. We are accused of ignorance, of greed for money, and of not practising what we preach; on the other hand, we are praised by other writers for our learning, and for our liberality and generosity. It would appear that praise and dispraise pretty well cancel out, just as in the individual practice of each of us undeserved blame is balanced by unearned credit. We have seen that in the earlier periods of medicine blame was probably often well merited but that as the profession has risen in efficiency so it has gained in esteem. Even now, however, it is probably true to say that the individual doctor is better liked than the profession as a whole; and contemporary criticism is directed more against our so-called "medical etiquette" and our attitude towards the irregular practitioners outside our ranks than against our personal failings. Meanwhile, a survey of the praise and dispraise of which we have been the subject throughout the ages is worth while if it helps us, both as individuals and as a profession, to be ever more worthy of the one and undeserving of the other.

Note.—The quotations in this lecture are chosen from a much larger number, collected by Dr. Gladys Wauchope and myself, which are being published in the London Hospital Gazette as a "Medical Anthology."

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INFANTILE DIARRHŒA
WITH SPECIAL REFERENCE TO DEHYDRATION AND OTITIS MEDIA

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Infantile diarrhœa is among the most interesting of maladies, presenting problems for elucidation in preventive medicine, pathology, and physiology.

When acute diarrhœa occurs in previously healthy infants it tends to be somewhat self-limited. At the onset it may be of slight or choleraic intensity, but if the initial symptoms are survived there is a good chance of recovery, although relapse may follow. When, however, it occurs in a child previously undernourished or marasmic, the outlook is not nearly so good. The onset may be mild, but the illness develops with a certain momentum; improvement is often followed by relapse and one or more of these is likely to prove fatal.

It is seldom that a specific organism can be isolated, though infections due to dysentery bacilli (Flexner or Sonne) have been described. Nor are the post-mortem findings characteristic. In fatal cases the following appearances may be noted: Dehydration and wasting are extreme. The gut is inflamed but the degree of redness is not proportional to the severity of the symptoms, in so far as slight hyperæmia may sometimes be associated with severe diarrhœa; the lower ileum is usually involved; next in frequency is the colon and the stomach; then the duodenum and least often the jejunum. The erythema is patchy; sometimes the Peyer's patches and solitary follicles are specially affected, but often they are not. There may be submucous hæmorrhages, but definite ulceration is not common. Inflammation of the mesenteric glands is frequent, but in some cases, more especially in marasmic infants, the lymphoid tissues appear to be atrophic. The liver and kidneys are often fatty and sometimes markedly so. The lungs frequently show hypostatic congestion or broncho-pneumonia. The heart is usually dilated and the muscle pale. The pia-arachnoid may show œdema and the grey matter of the brain is often hyperæmic and looks pink. In 60 per cent. of autopsies pus-like material was found in the middle ears or mastoids, and occasionally in the nasal air sinuses (once in five cases examined).

BIOCHEMICAL CHANGES

The biochemical changes in infantile diarrhœa are very complex and depend primarily on starvation, loss of fluid, loss of salts, and toxæmia. In mild cases these changes may be slight, but if diarrhœa is severe, divergences from the normal are always considerable. The following observations are based on 243 examinations of 168 severe cases carried out in collaboration with Miss C. B. McArthur at the Infants Hospital; an analysis of 48 of these cases has been published elsewhere.[1]

Starvation.—In the diarrhœa of infants the starvation factor is well marked, but ketosis is not common and was absent in some of the worst cases; in 16 per cent. traces of acetone were found in the urine; in 13 per cent. much acetone was found, and in 3 per cent. diacetic acid as well as acetone.

Dehydration.—The influence of dehydration is more important. The variation in fluid content may be demonstrated by daily weighing or by hæmoglobin estimations. Thus an early case with 70 per cent. of hæmoglobin may show a rise to 90 per cent. in 24 hours, to be followed by a decrease to 80 per cent. or less as a result of treatment, and then again another rise to 100 per cent. as a result of continued diarrhœa. Such hydrolability is very characteristic of infantile diarrhœa. This loss of fluid greatly diminishes the blood volume and increases its viscosity, so that the peripheral circulation becomes small and sluggish. For this reason the extremities are blue and cold. Tissue oxidation becomes imperfect, so that lactic acid and other more complex acids are produced and these result in acidosis.[2]

The general deficiency in blood-supply is shared by the kidneys, which themselves may be further damaged by toxæmia. Water, urea, phosphate, and chloride are not freely excreted, and the retained urea may be very high; it was above 0·1 per cent. in 19 observations on 28 severe cases. The phosphoric acid retained as a result of renal insufficiency contributes to the acidosis.[3] Further, both acids and bases are lost in the frequent, loose stools, but as there is usually an excess of base excreted by the gut, there remains in the blood an excess of acid over base.[4] This is a further cause of acidosis.[5] In 9 per cent. of our 168 cases the alkali reserve of the blood was less than one-half (and in five cases less than one-fifth) of the normal. Moderate acidosis was present in 42 per cent. of the cases; in 33 per cent. the plasma bicarbonate was normal (22–28 millimoles) or nearly normal; 16 per cent. showed an alkalosis, including 6 cases where the alkali reserve was approximately doubled. Alkalosis has usually resulted from alkali therapy but in three instances appeared to be primary. The loss of salts in the stools, and of chloride in particular, is sometimes so great as to lead to a deficiency of chlorides in the blood (29 per cent. of our cases), but more often the accompanying loss of water is so much more marked and the blood in circulation so diminished in volume as to lead to an actual increase in the chloride content (33 per cent. of cases). It follows that the greater the dehydration, the greater the plasma chloride and the less the alkali reserve. There is thus a reciprocity between plasma bicarbonate and chloride, so that, generally speaking, they vary inversely (Table I.).

Table I.—*Plasma Bicarbonate and Chloride*

Alkali reserve (millimoles).	Plasma chloride.		
	Increased per cent.	Normal 95–105 mm.	Decreased per cent.
–10	75	19	6
10–20	50	44	6
20–30	25	39	36
30 and over ..	12	38	50

The abnormal acids circulating in the blood are excreted by the kidneys and hence the urine becomes excessively acid. These acids in the normal urine are combined partly with fixed bases, sodium, potassium, calcium, and magnesium, and partly with ammonia. This ammonia is formed by the kidneys as required. In the acidosis of diarrhœa, the fixed bases are retained to neutralise the acids in the tissues, and the acids of the urine are combined with ammonia. If the kidneys are relatively healthy, they are able to supply all the requisite ammonia, and the ammonia coefficient of the urine rises considerably. If, however, the kidneys are damaged by the general disorder, ammonia formation fails; a urine of intense acidity is excreted and the ammonia coefficient is not raised.

It would obviously be of value if one could determine the presence or absence of acidosis from the urine alone without tedious blood examinations. This, however, is not possible, for the reaction of the urine is often acid when the blood is normal, and even when the blood is excessively alkaline. Again, if the kidneys are failing, acidosis is not accompanied by a raised ammonia coefficient; on the other hand, the ammonia coefficient, although often raised in the presence of acidosis, may be quite high when the alkali reserve is normal or increased. It is certainly true to say that an alkaline urine never occurs with acidosis, but this sign is of little value, since alkaline urines are rare in any stage of diarrhœa (Table II.).

TABLE II.—*Plasma HCO_3 and Urine (pH, &c.).*

—	Acid urine (pH 6·2 and less).	NH_3 coefficient to—		
		−8 per cent.	8–12 per cent.	12 per cent. and over.
	Per cent.			
Marked acidosis	100	14	29	57
Moderate acidosis	84	14	29	57
Normal	78	32	26	42
Alkalosis ..	60	45	25	30

Similarly with regard to the urinary chloride: if chloride is present in the urine, blood chloride may be high or normal; it is probably not low. On the other hand, absence of chloride from the urine tells us nothing about the chloride concentration of the blood, which may be low or normal; or if the kidneys are so damaged as to fail in the excretion of chloride, the urine may be chloride-free while there is a considerable accumulation of chloride in the blood (Table III.).

TABLE III.—*Plasma and Urine Chloride*

	Urine chloride less than 0·08 per cent.
Plasma chloride less than 95 mm. ..	89 per cent.
Plasma chloride 95–105 mm. ..	57 ,, ,,
Plasma chloride over 105 mm. ..	45 ,, ,,

Blood and Cerebro-spinal Fluid Chloride.—The relation between the plasma and cerebro-spinal fluid chloride is closer, the latter running parallel with but higher than the former. For this reason the cerebro-spinal fluid chloride is sometimes increased by 50 per cent. in renal retention cases, while in the rarer examples of chloride depletion, cerebro-spinal fluid chloride readings of 90 millimoles (0·52 per cent. NaCl) and less may be encountered. Most of our cerebro-spinal fluids were obtained *post mortem*, but the findings were confirmed by estimations made on five fluids obtained during life for suspected meningitis.

SIGNIFICANCE OF BLOOD CHANGES

It may be said that the following chemical findings have a bad prognostic significance: (1) acidosis with a low ammonia coefficient; (2) alkalosis with an acid urine. The degree of acidosis alone is no guide to the severity of a case, for patients with marked acidosis may recover and others with a normal alkali reserve succumb. In fact, blood examinations tell us little prognostically beyond what can be directly observed from the patient's dehydration and other clinical signs. The chemical findings have, nevertheless, a very definite bearing on the type of extra fluid which should be given therapeutically to make good water and mineral loss. One result of biochemical investigations has been to show that normal saline is an unsuitable fluid to administer to dehydrated infants (Hartman[6]) and is on the whole contra-indicated in cases of infantile diarrhœa.

The sum of chloride plus bicarbonate in the blood is set at a fairly constant level (about ⅛ molar) and they are complementary in the sense that if the amount of one increases the other decreases in order to keep the sum of HCO_3 plus Cl constant. Thus, if we inject a strong solution of saline into an infant we raise the blood chloride from the normal 0·6 per cent., and in order to bring the HCO_3—plus—Cl back to normal as quickly as possible the kidneys excrete not only chloride but also bicarbonate. Hence the injection of salines leads to a complementary elimination of the alkali reserve and thus to an acidosis.

If, as is often the case, low plasma bicarbonate, high chloride, and dehydration exist before treatment, chloride injection increases the acidosis and blood chloride still further. It may also increase the dehydration. Thus if 150 c.cm. of 0·9 per cent. saline are injected, the blood chloride will rise. If the kidneys are not functioning well the patient may become œdematous; if renal function is good the kidneys endeavour to excrete the great excess of chloride in the blood. It is a matter of experience that the chloride in the urine is not likely to exceed a concentration of 0·45 per cent.; hence, in order to eliminate the excess of sodium chloride in the 0·9 per cent. saline injected, at a concentration of 0·45 per cent. or less in the urine, much of the extra fluid is wasted, and if copious saline injections are given in the course of a day, the patient may actually sustain a net loss of fluid in the exchange.

This sequence of events is denied by Hoag and Marples,[7] who find that injections of normal saline neither raise blood chloride nor increase acidosis. It must be noted, however, that their saline infusions were supplemented with copious intravenous injections of glucose. Routine intravenous therapy of this kind complicates treatment and, in its absence, it seems likely that acidosis may still be expected. Few of our cases received normal saline, but our experience agrees with Hartmann. Thus in one patient so treated the blood chloride doubled in a few hours and a condition of general œdema with symptoms of cerebral irritation developed. Later, however, the œdema disappeared and the child relapsed into a condition of profound dehydration.

As an alternative to 0·9 per cent. saline, half-strength saline may be used and is to be preferred. Glucose has certain advantages, because the glucose can be completely oxidised in the body and does not require to be excreted by the kidneys; the whole of the water therefore in which it is dissolved can be entirely devoted to the relief of dehydration. Hoag and Marples rightly insist on the importance of maintaining a free secretion of urine, and for this reason we feel that it is wisest to combine glucose (2½ or 5 per cent.) with hypotonic saline (0·45 per cent.). The fluid so added to the body improves the peripheral and renal circulation and so helps to remove acidosis. But if the acidosis is severe, glucose alone will not act promptly enough and sodium bicarbonate must be given as well. The risk of overdosage with alkali is slight; it may be suspected if the breathing becomes shallow, but can only be demonstrated with certainty by blood examination. Sometimes overdosage with alkali is accompanied by the excretion of an alkaline urine, and this is a favourable sign; in bad cases, however, a marked and dangerous excess of alkali may exist in the blood, which the kidneys, being damaged, fail to excrete and hence the urine remains strongly acid.

To avoid the risk of alkalosis, and also the execution of tedius blood examinations, Hartmann of St. Louis has introduced a buffered lactate solution.[8] It consists of a weak solution of sodium lactate and saline. The solution itself is neutral and does not tend to disturb the reaction of the blood while, if acidosis be present, the lactate is converted into bicarbonate and is available for neutralisation. If, on the other hand, acidosis is absent, the conversion of lactate into bicarbonate is so slow as to render the risk of alkalosis very slight.

TREATMENT

In spite of all that has been written in recent years on the treatment of infantile diarrhœa, prophylactic measures still remain the chief weapon in reducing the mortality from this disease. Breast feeding is the great safeguard. The consensus of opinion seems to favour moderate purgation and starvation in early cases only, but to avoid these procedures in cases of longer standing. It is usually conceded that fat and carbohydrates are not well tolerated. In three cases of the present series it was thought that skimmed breast milk was valuable.

Of the several symptoms associated with diarrhœa and vomiting it is possible to discuss here only three: dehydration, ketosis, and otitis media.

Dehydration.—The alleviation of this condition is of paramount importance. There is a choice of routes, and fluid may be given orally, subcutaneously, intraperitoneally, or intravenously in this order, until the dehydration is relieved. Oral administration alone is seldom successful in cases of any severity: the intestinal capillaries are collapsed and absorption from the gut becomes uncertain and erratic. If absorption does not occur, glucose and saline given by mouth add to the fluidity of the bowel contents and increase diarrhœa. A suitable fluid for oral administration is sodium bicarbonate, ½–1 per cent., with glucose, 5 per cent.

If dehydration is severe, fluid may be given subcutaneously or by the intraperitoneal or intravenous route. For all-round utility, subcutaneous injections are suitable. Glucose, 5 per cent. with 0·45 per cent. saline, may be used. The sugar must be pure and is best sterilised as a dry powder and added to warm sterile water. Failing this, 0·45 per cent. saline may be given. Sodium bicarbonate is valuable, but its sterilisation is a complicated procedure. It is not suitable for general use. Hartmann's buffer lactate solution is very useful in severe cases, when it is safe to assume that acidosis is present. Several ounces may be given at a time, and it may be repeated several times a day.

The great advantage of intraperitoneal injection is that five or more ounces may be given at a time. Sodium bicarbonate and glucose are not suitable for intraperitoneal injection, and although 0·45 per cent. saline may be given, the buffer solution recommended by Hartmann has certain advantages. While it is customary for the nursing staff to give subcutaneous saline, intraperitoneal injections must necessarily be given by one of the medical staff, and therefore are not as easily arranged.

Intravenous therapy should be employed in all urgent cases; 10 c.cm. of fluid per pound body-weight is a proper amount, and 7·5 per cent. glucose may be used or, if acidosis is present, Hartmann's buffer solution. If available, a sterile solution of glucose, 5 per cent., and sodium bicarbonate, ½–1 per cent., is valuable in cases with severe acidosis. Intravenous injections may be given by the method described by Marriott.[8] A brachial vein is safest but least easy of access; the external jugular is more easily entered and, if neither of these is available, then the superior longitudinal sinus may be used. Sometimes the temporal or external saphenous veins are found suitable.

In America blood transfusion has been widely used, but at the Infants Hospital the results of this form of treatment have not been good. Of 20 very severe cases 3 were greatly improved, but the others were not benefited. Perhaps if small repeated transfusions were given earlier in the disease better results might be obtained; 10 c.cm. per pound body-weight was usually given and by the same routes as mentioned for intravenous salines.

There is no doubt that the parenteral injection of fluid is very valuable. A few patients seem shocked by the procedure, but the majority appear to suffer little discomfort. For routine use, subcutaneous or intraperitoneal injections are most useful and sometimes the results are strikingly good. Frequently the ultimate result does not fulfil the promise of early treatment. The continuation of the diarrhœa may necessitate repeated injections which fail to keep pace with the loss of fluid; dehydration recurs and death is not long delayed. It sometimes happens that an infant is sustained for weeks by fluid administered in this way. In our experience, however, although subcutaneous injections will often prolong life in desperate cases for three or four days and thus give the infant's powers a chance to overcome the infection after this period we have shot our bolt and little can be expected from further injections. Nevertheless a definite number of infants are saved in this way who otherwise would be lost.

Ketosis in Infantile Diarrhœa.—While acidosis is common in this disease, ketosis is rare; sometimes, however, much acetone and diacetic acid are found in the urine. In such cases, if the symptoms are severe, glucose and small doses of insulin are useful, but owing to the risk of hypoglycæmia no case should be treated in this way outside a hospital, where it can be under constant close supervision and the treatment can be regulated by blood examination. In cases without ketosis, insulin is not helpful.

OTITIS IN INFANTILE DIARRHŒA

We carried out examinations of the middle ears at the Infants Hospital during 1931 and the early months of 1932. The object was to arrive at some definite conclusion with regard to the significance of otitis media and the part it played in the ætiology of infantile diarrhœa and the form of treatment which should be adopted. All the cases of diarrhœa and vomiting were in-patients at the Infants Hospital during the period mentioned and all but two were under the age of nine months. In every instance there was considerable dehydration with loose, frequent stools.

Altogether there were 72 cases of diarrhœa and vomiting, of which 37 (51 per cent.) recovered. In a preceding investigation routine examination of the ears during life was not made, but post-mortem examinations showed that pus-like material was present in the middle ears in 41 of 68 fatal cases. This contrasts with the findings in other diseases where pus was found in 10 of 33 autopsies. The term pus is used throughout this paper to mean thick creamy yellow or green fluid, and not merely a turbid fluid such as is often present in the ears of infants. Since routine examination of the ears has been adopted 72 cases of diarrhœa and vomiting have been followed.

In all cases in which otitis media occurred a correct diagnosis was made, except in one case which was considered to have been normal during life but which was shown to have pus post mortem.

Facies.—While it is common knowledge that otitis media during the last six months of the first year of life is associated with pulling or rubbing the ears, rolling the head, flushed cheeks, restlessness, and crying, it is not generally recognised that in the early months it may be present without these symptoms in a listless, apathetic, pale, toxic-looking child. The grave condition of the child who lies in a somnolent state—with, perhaps, head retraction—may suggest a diagnosis of intracranial trouble. A rise of temperature of varying extent was present in all our cases. In the majority the maximum temperature was between 100° and 103°, the marasmic infants tending to the lower temperatures.

Ears.—In examining the ears in small children an electric auroscope is almost essential. In any case of diarrhœa and vomiting the following appearances of the ears may be found :—

1. *The drum may look normal.*—The normal infant's drum is pearly grey and translucent, although the light reflex is not as bright as it is in adults. It may be difficult or even impossible to see the drums in some infants, because they may be placed too obliquely, or the meatus may be too small, or the lumen may be blocked by debris or numerous fine hairs.

2. *The drum may be pinker than normal.*—Before the drum can be considered pathologically hyperæmic it is necessary to exclude such causes of temporary hyperæmia as recent cleaning or syringing the meatus, or even crying. Provided that such causes can be excluded, it may be assumed that a hyperæmic drum results from infection of the middle ear. If the drum is only faintly pinker than normal, preserves its translucency, and is not bulging, the condition is only catarrhal, and will probably subside without myringotomy. If, however, the drum is pink and no longer translucent or if it is definitely red, pus is probably present. If in addition the drum is not only red but bulging, the presence of pus may be assumed with confidence (Case 1). The amount of pus which is present in these cases varies considerably. Where the drum is bulging, pus usually wells up immediately the incision is made; in others only a bead of pus escapes, and in still others none at all. In such cases as these last it has been found that gentle aspiration may reveal pus which would otherwise escape observation. In our experience this may best be accomplished by attaching a rubber bulb to the side opening of the electric auroscope and exerting gentle suction with the bulb (Case 2).

3. *The drum may be pale.*—In certain cases no hyperæmia of the drum was noticed at any time, the drum on first inspection presenting a greyish-white, opaque appearance with a diminished or absent light reflex. In some instances dilated vessels were observed coursing over the drum in leash-like fashion from the posterior superior wall of the meatus (Case 5). It was especially in such cases that the presence of pus was not revealed until suction was applied.

4. *Meatus.*—In certain cases the posterior superior meatal wall was red and swollen, and sometimes sagged into the lumen of the meatus (Cases 2, 3, and 4). Although in most instances these changes were accompanied by changes in the drum, in a few no such tympanic changes were present. These meatal changes are, of course, well known, and it seems probable that they are the result of disease in the mastoid antrum. Occasionally sagging of the meatal wall was so marked as completely to obscure the drum. In no instance was any post-auricular redness or œdema noticed.

The detailed findings are as follows: in 37 cases examined aural infection was bilateral in 25 and unilateral in 12. The drums were red in 29 cases and in 9 of these bulging was observed. The posterior superior meatal wall was red and swollen in 15 instances. In 11 of these the drum was red, in 2 it was white and opaque, and in 2 it appeared normal. Opaque white drums were seen on 6 occasions.

The Blood Count.—With the occurrence of otitis media an increase of the polymorphonuclear cells was usually noted. Leucocytosis, however, has no positive diagnostic value, although its absence suggests that aural infection is unlikely :—

	Otitis (21 cases).	No otitis (17 cases).
Polymorphonuclears— 60 per cent. or over ..	13 (62%) ..	6 (35%)
Total leucocytes— 13,000 or over per c.mm.	18 (85%) ..	7 (41%)
Polymorphonuclears— 8000 or over	18 (85%) ..	5 (29%)

Treatment.—In view of the unsatisfactory results of untreated otitis media, some of the later cases received local treatment. Of 17 untreated cases 3 recovered, 2 having drained and 1 having resolved spontaneously; mortality, 80 per cent. Of 20 treated cases 10 recovered; all had paracentesis and 5 had antrotomy (bilateral in two instances); 10 died: all had paracentesis and 5 had antral drainage (1 bilateral); mortality, 50 per cent. In 35 cases without otitis the mortality was 31 per cent.

CASE-HISTORIES

CASE 1.—Five months. Admitted March 4th, 1931. Diarrhœa and vomiting three days. Temp. 103° F. March 6th: Right drum red and bulging; left drum red but not bulging. Paracentesis both drums; pus welled up from the right but not from the left. March 13th: Right ear still discharging but less than during the last three days. Left ear dry. Child made uninterrupted recovery.

CASE 2.—Two months. Admitted June 10th, 1931. Temp. 101° F. Severe diarrhœa and vomiting. Both drums pink. June 15th: Temperature fallen to normal but child looking very ill. Diarrhœa and vomiting unaltered. Both meati red and œdematous; drums cream-coloured, sodden, and opaque. Drums incised but no pus escaped until suction applied with Seigel's speculum. Pus then welled up. June 17th: Ears discharging freely. Diarrhœa and vomiting stopped, and general condition much improved. June 24th: Right ear clean and dry but abscess pointing through left superior meatal wall. Abscess opened and drained. Child's general condition not as good as week ago. June 30th: Both drums pale and sodden. Child much worse. Paracentesis yielded pus both sides. Double antrotomy under local anæsthesia revealed both mastoids full of pus. Child died 12 hours later.

CASE 3.—Ten weeks. Admitted Oct. 13th, 1931. Diarrhœa and vomiting five days. Loose, frequent, green stools with severe dehydration. Oct. 15th: Drums normal but both meati red and œdematous. Oct. 16th: Drums pale and opaque, upper part of drum and superior meatal walls more œdematous than on 15th. Both mastoids opened under local anæsthesia. Pus present on both sides. Cultures yielded a pure growth of *pneumococci.* Blood transfusion of 60 c.cm. given at same time as operation. Oct. 17th: Child much improved. Temperature falling, no vomiting. Oct. 18th: Further improvement. Child made excellent recovery. No vomiting and stools rapidly became normal after operation.

CASE 4.—Twelve months. Admitted May 12th, 1931. Otorrhœa left ear and adenitis. Vomiting and loose stools. Temp. 104·8° F. May 15th: Perforation right drum. Very little discharge. Superior meatal walls very œdematous. Profuse discharge from left ear. May 18th: Right ear shows a large bullous swelling with dilated vessels on its surface projecting from the superior meatal wall. Swelling completely obscures the drum. On making an incision into this swelling a large amount of pus escaped. May 20th: Right ear discharging freely. Child much better. June 2nd: Child quite well. Right drum normal, and only slight trace of incision on meatal wall.

CASE 5.—Eight months. Admitted June 8th, 1931. Diarrhœa and vomiting three days. Temp. 103° F. Drums normal. June 10th: Drums pale with leash of dilated vessels spreading from superior meatal walls on to drums. Paracentesis: no pus obtained. Child died four days later. Post mortem: both mastoids full of pus.

DISCUSSION

The association of diarrhœa with otitis has long been known and the frequent finding of pus-like material in the ears post mortem was demonstrated by Renaud.[9] While a few of these fluid collections are due to post-mortem degeneration (Alexander[10]) the presence of pus cells and hæmolytic streptococci indicates that the majority are ante-mortem.

The sequence of events in combined intestinal and aural infection has led to much divergence of opinion, although it is agreed that the frequency of otitis may be explained by the disposition of the Eustachian tube, which in infancy is relatively short and straight. Marriott[11] and Jeans and Floyd[12] have thought that a streptococcal otitis or mastoiditis is often, though not always, primary. Marriott states that the drum usually showed changes and that there was a consistent sagging of the posterior superior meatal wall near the drum. As the aditus is too small in infants to permit drainage from the antrum through the middle ear, double antrotomy was carried out, and Marriott reports that the procedure gave almost immediate relief of symptoms in a large proportion of cases. Wishart[13] and Maybaum,[14] on the other hand, are of the opinion that otitis and mastoiditis are secondary events. They point out that aural infections are rarely present when patients are first admitted to hospital but develop during their stay in the ward, and are not infrequently agonal events which take place during the last day or so of life and have no real influence on the course of the intestinal intoxication. Maybaum advocates local treatment, but only in the presence of definite local indications.

We are of opinion that the significance of otitis varies in different patients. In three cases otitis preceded enteritis, and in these paracentesis gave good results. In a little more than half of the cases signs of aural infection were present soon after the diarrhœa and vomiting began and were observed within four days of the patients' admission to hospital. The remaining instances of aural infection were late, and sometimes signs were only noticed for the first time when death was imminent.

It seems clear that otitis is rarely the primary cause of intestinal intoxication. On the other hand, once secondary otitis or mastoiditis has occurred a new obstacle to recovery has arisen, and one may well doubt if resolution of the intestinal lesion is possible in the absence of free aural drainage. We consider that if the drums are red and bulging they should be incised. If the drums are red but not bulging and the patient is not very ill, incision may be delayed, but if further deterioration occurs paracentesis should be carried out. Often a bead of pus escapes but sometimes puncture is negative. In some of the latter cases pus may well up after the application of suction through a speculum.

If signs are negative the ears should be left alone. While myringotomy is not a severe operation, the question of antrotomy is more anxious. Marriott and many others state that double antrotomy gives rise to very little shock. We agree that the degree of shock is much less than might have been expected, and that antrotomy should be carried out provided that there is definite œdema and redness of the posterior superior meatal wall. Our small series of cases suggests that adequate aural drainage definitely reduces mortality and possibly better results might have been obtained with earlier operative treatment.

Coates[15] and others express the view that if myringotomy fails to relieve the general symptoms, then this in itself is an indication for double antrotomy. Findlay[16] on the other hand finds the results of aural treatment very disappointing. One must remember, however, that the mortality in severe diarrhœa is high, even when the condition of the ears is unimpeachable; and hence when aural complications are present myringotomy or antrotomy must often be followed by failure.

In conclusion it is necessary to bear in mind that the mortality in infants with enteritis of moderate and marked severity is over 50 per cent., and at present no line of treatment gives consistently good results. Much research of a biochemical and bacteriological nature remains to be done on the management of the developed case, but one will always have to depend chiefly on preventive measures to lower the mortality from infantile diarrhœa.

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THE BLOOD SEDIMENTATION RATE AND THE PLASMA PROTEINS

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FAHRAEUS in 1918 reawakened interest in the difference between the behaviour of shed blood in health and certain morbid conditions.[1] He pointed out that the rate of fall of the red blood corpuscles after the addition of an anticoagulatant (which rate of fall is termed now the sedimentation rate) was accelerated in pregnancy and various pathological states. The nature of the reaction has remained to this day a problem and numerous explanations have been put forward to account for it.

There are certain factors in this connexion on which it may be said that nearly all observers are agreed: firstly that the red corpuscles aggregate into clumps, thus increasing the size of the sedimenting particles; secondly that the force or forces which cause the corpuscles to aggregate are inherent to the plasma and not to the corpuscles themselves; and thirdly that the number of corpuscles influences the rate, the latter being increased when the corpuscles are reduced.

Amongst the theories that have been advanced has been (1) that the agglutination of the red corpuscles is caused by an absorption phenomenon resulting from the lowered electrical burden of the suspended particles, and thus the sedimentation rate depends on alterations in height of the electrical burden of the particles; (2) that it is controlled by the viscosity of the blood; and (3) that sedimentation depends on the composition of the plasma proteins. Some observers believe that it is the fibrinogen in the plasma that regulates the rate of sedimentation; others believe it to be the plasma globulin, and still others maintain the all-important factor to be the fibrinogen-globulin-albumin ratio, the fibrinogen and globulin tending to increase the sedimentation rate and the latter to decrease it. Some hold that it is possible for all these three theories to be correct. However, there can be little doubt that the theory that the composition of the plasma proteins determines the sedimentation rate is the most widely held one and is the one that appears in modern text-books (e.g., Beaumont and Dodds[2]).

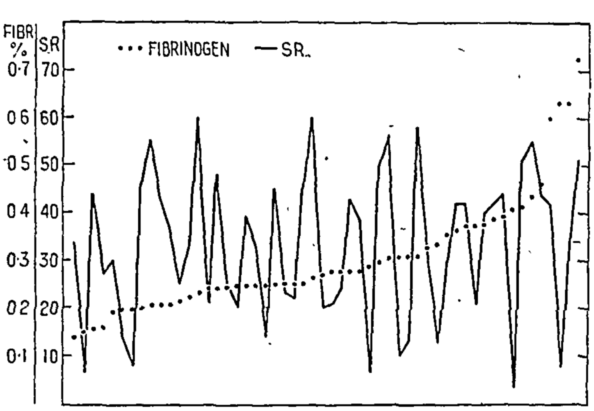

FIG. 1.—The percentages of fibrinogen in the blood plasma of 54 patients are arranged in ascending order of magnitude (black dots). The sedimentation rates of the same patients, when joined by a black line, show no general upward trend to correspond with the upward trend of the black dots. This shows that there is no relation between fibrinogen percentage and the rate of sedimentation.

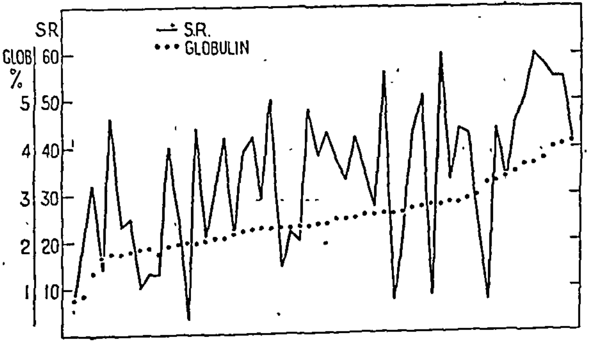

FIG. 2.—Here the black dots represent the percentages of globulin arranged in ascending order. Again the corresponding sedimentation rates show no significant upward tendency.

We undertook the present investigation in order to throw light on a subject in which, we believe, theory rests on an insecure foundation of experimental evidence. Our investigations lead us to conclude that the sedimentation rate has *no* connexion whatsoever with the fibrinogen, globulin, or albumin of the plasma.

Gram[3] in 1921 estimated the fibrin content of the blood in normal and pathological conditions and found that the sedimentation rate depended on the fibrinogen percentage of the plasma, the sedimentation being accelerated by a rise in the value and vice versa. This method of estimating the fibrinogen, Gram described at a later date (1929)[4] as "primitive."

Fahraeus[5] made solutions of the different protein fractions of the plasma prepared by precipitation with ammonium and magnesium sulphate, and to these solutions added corpuscles obtained by centrifuging and washing with saline. He found that the red corpuscles behaved differently in the various solutions. When suspended in a pure fibrinogen solution, they aggregated and settled with marked rapidity. When suspended in a pure serum globulin solution, aggregation and sinking were not so pronounced, but still very marked. When suspended in a pure solution of serum albumin, on the other hand, the red corpuscles did not aggregate and sedimentation was very slow.

It is doubtful, however, whether this experiment proves that this is what occurs in shed blood, since, as pointed out by Race,[6] centrifuging and washing with saline alters the shape of the corpuscles, and may also result in the adsorption of sufficient electrolytes to impart a positive charge to the corpuscles.

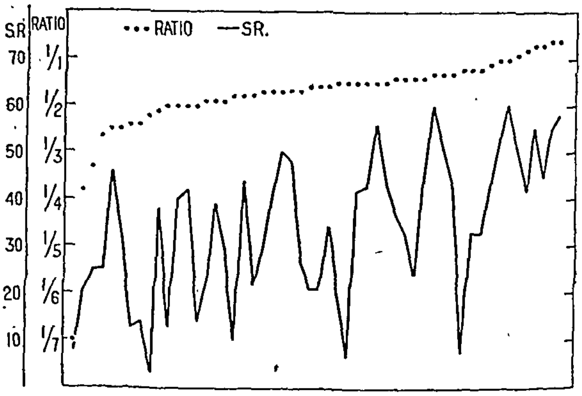

FIG. 3.—Globulin-albumin ratios plotted against sedimentation rate. No parallelism.

Fahraeus further states that he has determined the composition of the plasma proteins and the sedimentation rate in the same clinical cases and found that there was a pronounced parallelism between the amount of fibrinogen or serum globulin and the sinking velocity. No figures, however, are given and this appears to be true of the reports of numerous other investigators whom he states confirm his results.

All the patients we have dealt with have been those suffering from some form of rheumatic disease. Whilst no actual discrimination has been used in selecting the cases, the majority of the cases utilised have been those of rheumatoid arthritis. It is well known that in this condition the sedimentation rate is greatly accelerated; in gout it is slightly accelerated, whilst in true osteo-arthritis and fibrositis it is within normal limits.

METHODS OF ANALYSIS

The sedimentation rate was estimated by the following method. Eleven to twelve cubic centimetres of blood were drawn off with an oxalated syringe and transferred to a graduated centrifuge tube. After standing half an hour to acquire room temperature the contents were thoroughly mixed by repeated inversions and adjusted to 100 divisions (= 10 c.cm.). The fall in one hour after mixing was taken as the measure of the sedimentation rate for the purpose of this investigation. The room temperature varied from 15° to 20° C. and slightly affected the rate, but not enough to require any important adjustment of the results.

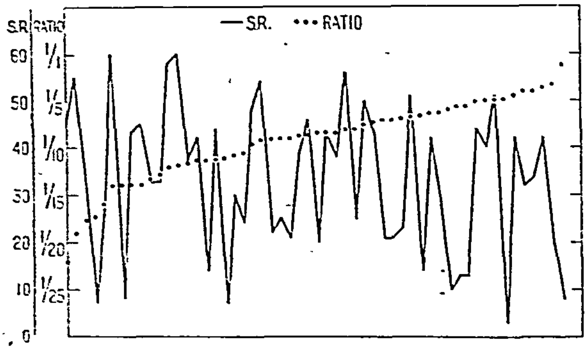

FIG. 4.—Fibrinogen-globulin (F/G) ratios plotted against sedimentation rate. No parallelism.

Plasma was obtained from the above specimen of blood after estimating the sedimentation rate, by centrifuging or allowing to stand overnight, the clear plasma from each sample being tubed off. Analysis of the proteins was immediately proceeded with. In the protein estimations the following procedure was adopted. As from 3–5 c.cm. clear plasma were available for analysis, micro-chemical methods were not resorted to. Wu's colorimetric method [7] based on estimations of the tyrosine factor in the three proteins was found unsuitable, but his ingenious method of separating the fibrin on a pointed rod was adopted. Gram,[8] who gets his fibrin as a round slab on thicknesses of filter paper by a similar method, determines it by direct weighing after two purifications and complete drying. We found it more convenient to determine the nitrogen on the pointed rod by digestion and nesslerising.

The whole scheme of analysis rests on four nitrogen determinations, the two larger amounts by Kjeldahl process and alternatively, the two smaller ones by modified digestion method and nesslerising. Ammonia-free distilled water was used for preparation of all reagents and dilutions, and reagent blank controls were made.

(1) *Total nitrogen.*—0·5 or 1 c.cm. plasma is delivered into a Kjeldahl flask from a capillary pipette graduated to 0·01 c.cm.; 5 c.cm. of (AR) H_2SO_4 added, with 3 drops of 5 per cent. copper sulphate, and digested until colourless, with or without, 1 g. K_2SO_4. After cooling, the mixture is transferred with the washings to a distillation flask, 40 c.cm. NaOH solution of sufficient strength to render alkaline added, and the NH_3 distilled off and titrated with N/20 H_2SO_4, using methyl-red as indicator.

(2) *Albumin nitrogen.*—1 c.cm. of plasma is measured with the same pipette as above, and delivered into a stoppered cylinder containing 30 c.cm. 22·2 per cent. solution of anhydrous Na_2SO_4 previously warmed in an incubator at 37° C. After three hours at 37° C. the mixture is filtered through a close filter and 15·5 c.cm. of filtrate (= 0·5 plasma) is transferred to a Kjeldahl flask and finished in like manner. Globulin and fibrinogen having been separated by Na_2SO_4, the nitrogen of the filtrate is albumin N and non-protein N.

(3) *Fibrinogen nitrogen.*—1 c.cm. plasma is delivered into a beaker containing 28 c.cm. normal saline, 1 c.cm. of 2·5 per cent. solution of $CaCl_2$ added, and the mixture is allowed to stand 30 minutes. The jelly thus formed is cut by small rod with pointed end and transferred gradually to small open filter, in which the rod is kept slowly rotating. Every trace of fibrin is collected on the point of the rod, which is then squeezed in a clean filter paper and transferred to a pyrex digestion tube containing 1 c.cm. digestion reagent (10 c.cm. 5 per cent. $CuSO_4$ solution, 100 c.cm. (AR) H_2SO_4, 100 c.cm. water). The pyrex tube is gently heated until dense fumes escape, cooled for 30 seconds, and 30 per cent. H_2O_2 solution added drop by drop until the liquid is colourless—two or three drops should be sufficient. The tube is then re-heated for a minute or two until dense fumes again escape, allowed to cool, and diluted to 85 c.cm., cooled, 15 c.cm. Wu's Nessler solution

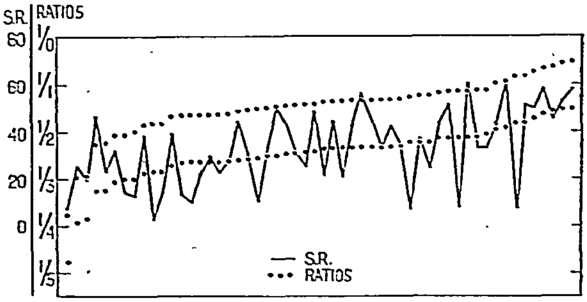

FIG. 5.—The upper black dots represent the ratios F+G/A; the lower represent F+G/total proteins. These two rows run parallel to each other, but not to the sedimentation rates.

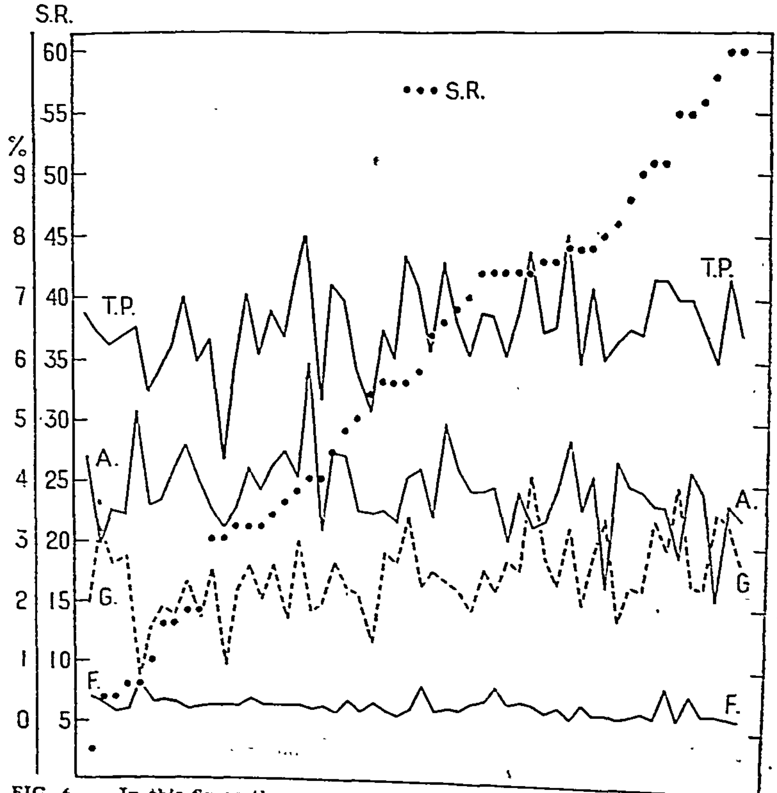

FIG. 6.—In this figure the aspect is reversed, for here it is the sedimentation rates of the 54 patients that are plotted in ascending order. Their steep rise is not paralleled by any corresponding rise in the percentages of total proteins (T.P.), albumin (A.), globulin (G.), or fibrinogen (F.).

is added, the tube is again cooled and ammonia measured in a colorimeter.

(4) *Non-protein nitrogen.*—1 c.cm. of plasma is delivered into a mixture of 5 c.cm. 20 per cent. trichloracetic acid with 4 c.cm. of water, thoroughly mixed, allowed to stand 30 minutes, and then filtered. 5 c.cm. of filtrate (=0·5 c.cm. plasma) are digested as under fibrin, cooled, diluted to 35 c.cm., again cooled, 15 c.cm. Wu's Nessler reagent added, again cooled, and a colorimetric reading is taken against 1·5 c.cm., standard ammonium sulphate (=0·01 mg. nitrogen per c.cm.) diluted to 35 c.cm. with water and made up to 50 c.cm. with Wu's Nessler reagent.

RESULTS

In 54 cases of rheumatic disease, the sedimentation rate has been estimated and the plasma proteins analysed. The graphs illustrating the values found show clearly that no parallelism exists between the sedimentation rate and the fibrinogen percentage (Fig. 1) or the globulin percentage of the plasma proteins (Fig. 2). Further, they show that the sedimentation rate has no connexion with the globulin-albumin ratio (Fig. 3), the fibrinogen-globulin ratio (Fig. 4), or the ratios of fibrinogen plus globulin to albumin and to total proteins (Fig. 5).

The findings are summarised in Fig. 6.

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ON THE PROTECTIVE ACTION OF "BAYER 205" AGAINST THE TRYPANOSOMES OF MAN

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PREVENTION is better than cure and successful prophylaxis is prevention on a large scale. Before the appearance of Bayer 205 prophylaxis against the diseases of man by the use of drugs, as distinct from sera and vaccines, could claim little or no success.

For many years the medical profession has been debating about the value of quinine as a prophylactic in malaria. In the tropics, at all events until lately, such was the uncertainty prevailing on this point that individual practitioners in one and the same tropical township often differed diametrically in their views on this all-important point, to the despair and confusion of their clients. The work of Yorke and MacFie (1924) was the first scientific warning that all might not be well with the time-honoured ritual, practised the world over by Europeans "east of Suez," of the 5-grain tablet taken each evening with the first "sundowner." Of recent years a commission of the League of Nations has studied this question experimentally, and in the third general report of the Malaria Commission the conclusion is promulgated that "No drug which is known, taken in harmless doses, can be guaranteed to act as a true causal prophylactic." Apart from malaria, protection against the diseases of man is limited in its effective operation to the day or so following the administration of the drug. An injection of stovarsol may protect against exposure to yaws or syphilis, but the effects are limited, and David Lees in his text-book on venereal diseases is by no means enthusiastic about its use in this manner. But with Bayer 205 and the trypanosomes of man the position is entirely different. What actually happens to the drug in the body the literature does not reveal very clearly. But we do know from direct experiment with monkeys, animals highly sensitive to *Trypanosoma rhodesiense* and *T. brucei*, that a single dose of Bayer given either subcutaneously or intravenously will protect for a month or more against the bite of tsetse cyclically infected with these trypanosomes. This fact places Bayer 205 in a class by itself as a prophylactic of unique properties and immense possibilities. It is the object of the research described in this paper to determine the full scope and value of the drug in the prevention and control of human trypanosomiasis.

EARLIER OBSERVATIONS

The early work on the action of Bayer 205 has been reviewed by Martin Mayer (1928), who summarises the main points bearing on prophylaxis as distinct from therapy. Kleine and Fischer's work in Northern Rhodesia in 1922 led them to abandon as unsatisfactory the oral administration of the drug. They found the intravenous and subcutaneous routes equally satisfactory. Mayer in his résumé recommends intravenous injection.

Kleine and Fischer showed that the injection into a monkey of 0·15 g. Bayer 205 protected the animal for two months against the bites of tsetse proved to be infective with *T. rhodesiense* or *T. brucei* (Kleine and Fischer, 1922). While working with the League of Nations Commission on Trypanosomiasis in Uganda and using a trypanosome of the *brucei* group from isolated wild tsetse on Damba Island on Lake Victoria, I obtained further evidence on this point (Duke, 1928).

> A healthy monkey, No. 21, received two doses of Bayer 205 intravenously, the first injection on Jan. 21st, 1926, and the second on March 30th. From May 31st till June 7th it was fed upon daily by a *G. palpalis* whose salivary glands were heavily infected with *T. brucei*. The monkey's blood remained free from trypanosomes, being examined daily in thick-stained films. On July 2nd and 3rd it was bitten by four flies carrying the same trypanosome. From July 3rd to 15th its blood remained free from trypanosomes, which appeared for the first time on the 16th, remaining more or less constantly present until the animal's death on August 4th. All the gland-infected flies fed upon this monkey had been previously proved to be readily infective to clean monkeys.

In this experiment two injections of Bayer 205 protected a monkey for 69 days against a trypanosome that was normally rapidly pathogenic to the species. The protection conferred by the drug wore off between the seventieth and ninety-fifth days after the last injection.

Experiments on a large scale on man were carried out in the Belgian Congo by Vanden Branden (1926–27) and by Van Hoof and myself (Duke and Van Hoof, 1928). These experiments consisted in the inoculation with Bayer 205 of a section of a native population living in an area known to be infected with *T. gambiense*, another section of this population being left untreated to serve as controls. Vanden Branden concluded as the result of his investigations along these lines that the protection conferred by a single dose from Bayer 205 lasted in man for some nineteen months. The Commission's experiment failed, for none of the controls became infected. Mayer considers that the evidence justifies the conclusion that a single dose of about 1 g. Bayer 205 per adult given intravenously will protect a man against *T. gambiense* from at least three months. He recommends that

TABLE SHOWING THE EXPOSURE OF VOLUNTEERS PREVIOUSLY INOCULATED WITH BAYER 205 TO CYCLICAL INFECTION WITH HUMAN TRYPANOSOMES CARRIED BY *G. palpalis*

Days after last inoculation of Bayer 205.	Volunteers.							Monkeys.			Days after last inoculation of Bayer 205.	Volunteers.						
	A	B	C	E	I	M	Q	1226†	1227†	1229†		A	B	C	E	I	M	Q
38	..	..	2g.	..	..	..	..	..	..	..	103	..	..	..	1d.	..	5b.^{3}	..
39	3a.	..	..	..	..	..	..	..	..	..	104	..	..	..	..	..	1b.^{3}	..
40	2a.	..	..	..	..	..	..	..	..	..	*105*	..	..	..	2b.^{2}	..	2b.^{3}	..
63	1b.	..	..	..	..	..	1b.^{2}	..	..	..	107	..	..	..	..	..	..	6b.^{3}
66	..	..	..	..	..	..	1b.^{2}	..	..	..	108	..	..	..	..	1b.^{3}	..	1b.^{3}
67	..	..	..	..	..	1b.^{2}	..	1b.^{2}	..	..	110	..	..	..	..	3b.^{3}	..	..
68	..	..	..	..	..	1c.	..	1b.^{2}	..	..	111	..	..	..	..	4b.^{3}	..	..
69	..	..	..	..	..	..	..	..	1b.^{2}	..	113	..	..	..	..	..	1e.	..
70	..	..	..	..	*1c.*	..	..	..	*1b.*^{3}	..	133	..	1b.^{3}	..	..	..	..	..
72	..	..	..	..	1c.	..	..	..	..	..	134	..	..	1b.^{2}	..	..	..	..
74	..	..	..	..	..	1c.	1c.	..	..	1d.	136	..	1b.^{2}	..	..	..	..	..
75	..	..	..	..	..	1d.	1d.	..	..	..	142	..	..	2b.^{2}	..	..	..	..
76	..	..	..	..	..	2b.^{2}	2b.^{2}	..	..	..	145	..	..	2b.^{2}	..	..	**1g.^{2}	..
77	..	..	..	..	..	1d. 2b.^{2} 1d.	1d. 2b.^{2} 1d.	..	..	1d.	146	1c.	..	..	..	..	..	..
78	..	..	..	..	..	1b.^{2}	1b.^{2}	..	..	..	147	..	1b.^{3}	..	..	..	..	..
79	..	..	..	..	..	1d.	1d.	..	..	..	149	1d.	..	..	..	..	..	..
80	..	..	..	..	2b.^{2}	..	..	..	..	..	174	..	..	2b.^{3}	..	..	..	..
81	..	..	..	..	2b.^{2}	..	..	..	..	..	179	..	1b.^{3}	4b.^{3}	..	..	..	..
82	..	..	..	..	1d.	..	..	..	..	..	180	..	1b.^{3}	1b.^{3}	..	..	..	..
83	..	..	..	..	1d.	..	..	..	..	..	181	..	..	1b.^{3}	..	..	..	..
88	..	..	..	..	..	..	..	..	..	..	182	..	..	2b.^{3}	..	..	..	..
91	..	..	1b.^{1}	..	..	..	..	..	..	..	187	1e.	..	..	..	..	..	..
92	..	..	3b.^{1}	..	..	..	..	..	..	..	190	2e.	..	..	..	..	..	..
95	..	..	2b.^{1}	1b.^{2}	..	..	..	..	..	..	208	..	2g.^{2}	..	..	..	..	..
99	..	..	..	..	..	..	2b.^{3}	..	..	..	210	..	4g.^{2}	..	..	..	..	..
100	..	1b.^{1}	..	..	..	..	..	..	..	..	212	..	1g.^{2}	..	..	..	..	..

EXPLANATION.

The numerals in the columns show the number of gland-infected flies biting man on that date.

a = *T. rhodesiense* strain Tinde III. (passage 1) controls: volunteers N and O, both infected.
b^{1} = ,, ,, LX. (,, 1) control ,, T infected.
b^{2} = ,, ,, ,, (,, 2) ,, ,, V ,,
b^{3} = ,, ,, ,, (,, 3) ,, ,, D ,,
c = ,, ,, Tinde II. ,, ,, U ,,
d = ,, ,, Tinde III. (passage 2) ,, ,, X ,,
e = ,, ,, ,, ,, (,, 3) ,, ,, ** ,,
g$_{1}$ = *T. gambiense* ,, LX. 1 ,, ,, P ,,
g^{2} = ,, ,, LXII. (cf. text).

** This fly was dissected the day after it fed on volunteer M. Both salivary glands were heavily infected and the alimentary canal was full of M's blood.

† Trypanosomes appeared in 1226's, 1227's, and 1229's blood 11, 9, and 8 days respectively after the first fly bite.

this dose be repeated every three months in those exposed to infection by cyclically infected tsetse in nature.

The Present Inquiry

The experiments now to be set forth were started in connexion with an investigation on the effect of long residence in antelope on the trypanosomes of man. Volunteers were used, and those who became infected were treated with Bayer 205 the moment trypanosomes were demonstrated in their peripheral blood. Three of these treated cases (A, B, and C in the accompanying Table) were chosen as the starting-point of the present research. Each of these men was infected with a strain of *T. rhodesiense* that had been for months in an antelope at the laboratory. In each case after an incubation period of eight to ten days trypanosomes appeared in the blood, and the patient complained of malaise and high fever (105° F.). The first dose of Bayer was given immediately trypanosomes appeared, and each patient received subsequently five more doses of 1 g. each dose at intervals of a few days.

Later on, at the conference held last November at Entebbe upon trypanosomiasis research in Eastern Africa, the examination of the prophylactic value of Bayer 205 was allocated to the Uganda Institute. Three healthy native volunteers were selected (I, M, and Q in the Table), and each received a single intravenous injection of 1 g. Bayer 205, and another treated volunteer (E) was added to the first list. In addition, three monkeys also received a prophylactic dose: 1226-27, 0·158 g. per kilo; and 1229, 0·023 g. per kilo body-weight.

The results of all these preliminaries are shown in the Table, in which are given the details of the exposure of each individual to infective tsetse. The numerals in the columns show how many gland-infected flies bit the volunteer on each occasion. Several strains of *T. rhodesiense* were used, and the infectivity to man of each batch of flies was tested on a separate, "clean" volunteer before the flies fed on the Bayer-treated subject. All the flies fed well, this being verified by observation and, in the case of the last feed of each insect, by dissection. Before being placed on the volunteer each fly was either starved for 48 hours and then given a second opportunity to feed on the following day, or was starved for 72 hours and then fed on the volunteer.

The honorary statistician to the research conference at Entebbe, Dr. C. H. N. Jackson of Tanganyika, expressed the opinion that for the results of this investigation to be statistically valid eight cases and eight controls would be sufficient, provided that 100 per cent. of the controls became infected and 100 per cent. of the inoculated cases remained uninfected. This estimate was based on the tacit assumption that all men are equal in their resistance to trypanosomes, a matter upon which recent research at Entebbe has thrown some doubt. This objection is in all probability negligible in the present investigation for the strains used were strongly pathogenic to man.

The Table shows that a single dose protected against *T. rhodesiense* for at least 113 days, and that those volunteers who had been treated with six doses of Bayer, after being infected for some ten to eleven days with *T. rhodesiense*, resisted all attempts at reinfection with different strains of *T. rhodesiense* for at least 190 days. On the other hand the monkeys both succumbed after 67, 69, and 74 days—in each case on their first exposure to infection after treatment with a single dose of Bayer 205.

The results obtained with *T. gambiense* are particularly instructive.

On the 113th day after receiving a single dose of Bayer 205, volunteer M was bitten by a fly carrying *T. rhodesiense.* On dissection the intestine of this fly was found to be full of M's blood and its salivary glands were heavily infected with flagellates, and had infected a volunteer before it bit M. M did not become infected, being still protected against *T. rhodesiense.* On the 145th day this volunteer was bitten by two flies whose glands were infected with *T. gambiense* strain LXII. Nine days later he reported sick; his temperature was 100° F. and he had a small tender swelling on the thigh where the flies had fed. Trypanosomes were found in the peripheral blood.

The administration of a single dose of Bayer 205 had therefore protected this man against *T. rhodesiense* for at least 113 days, but by the 145th day he was no longer safe against *T. gambiense.*

Turning now to the six-dose series of volunteers, we see that B was bitten by seven gland-infected flies carrying *T. gambiense* between the 208th and 212th days after the last administration of Bayer 205. Twenty-two days after the last of these flies had bitten him this man complained of mild indisposition and a small tender swelling on the forearm where the flies had fed. Trypanosomes were present in his peripheral blood. Thus volunteer B who was protected against *T. rhodesiense* for at least 180 days after the last administration of Bayer 205, by the 208th day possessed no defence against *T. gambiense.* It has not yet been determined how long protection lasts against *T. gambiense* in man; the only other experiment performed with this trypanosome being that upon volunteer C who resisted infection 38 days after his last dose of Bayer 205.

CONCLUSIONS

A consideration of the evidence now available suggests the following conclusions.

(1) That a single dose of 1 g. of Bayer 205 given intravenously will protect a man for at least 113 days from infection by tsetse carrying cyclically *T. rhodesiense.*

(2) That the administration of a second dose three weeks or so after the first enhances the protective effect of Bayer 205.

(3) That within certain at present undetermined limits the protective effect may be directly proportional to the number of doses given, although this point is not yet definitely settled. Three infected volunteers, all treated with Bayer 205 immediately trypanosomes were first detected in the peripheral blood and each receiving six doses of 1 g., were protected against *T. rhodesiense* for 180, 182, and 190 days respectively.

(4) That the natural sensitiveness of the mammal to the trypanosome plays an important part in determining the duration of the protection conferred by Bayer 205, the more susceptible monkey receiving less protection per dose per kg. body-weight than the more resistant man.

(5) It is probable, though not yet proved, that the protection conferred by Bayer 205 is greater against *T. rhodesiense* than against *T. gambiense. T. gambiense* is an old-established parasite of man and the power to infect him is a deeply rooted quality of this trypanosome, whereas recent research at Entebbe has shown that *T. rhodesiense* may in certain circumstances lose its pathogenicity to man. If, then, the resistance of man to *T. rhodesiense* is indeed greater than to *T. gambiense,* then this factor will in all probability tend to produce the effect suggested. It is also possible that *T. rhodesiense* is actually more sensitive to Bayer 205 than is *T. gambiense.*

Recent work at Entebbe has shown that strains of *T. rhodesiense* vary in their power to use man. It will be against the weakly endowed strains that the drug will be most effective, supplementing the natural resistance of the host. On the other hand *T. rhodesiense* strain LX, with which many of the tests in the Table were performed, was beyond all question strongly pathogenic to man, and only recently isolated from his blood. Protection against this strain is, therefore, a notable and an encouraging achievement.

At the present time, to be on the safe side, I consider that the prophylactic injection of 1–1·5 g. Bayer 205 per adult should be repeated every three months while exposure to infection continues. For biological reasons the strict enforcement of this period in *T. gambiense* areas is recommended. Where *T. rhodesiense* is concerned, I believe the protective effect of Bayer 205 will be greater than against *T. gambiense,* but it must be understood that this last is but an opinion and as yet unsupported by direct evidence.

The examination of these volunteers will be continued later on in the year, when this research will be resumed and extended.

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Clinical and Laboratory Notes

STREPTOCOCCAL SEPTICÆMIA

TREATED WITH ANTITOXIN AND TRANSFUSION

By G. Gregory Kayne, M.D., M.R.C.P. Lond.

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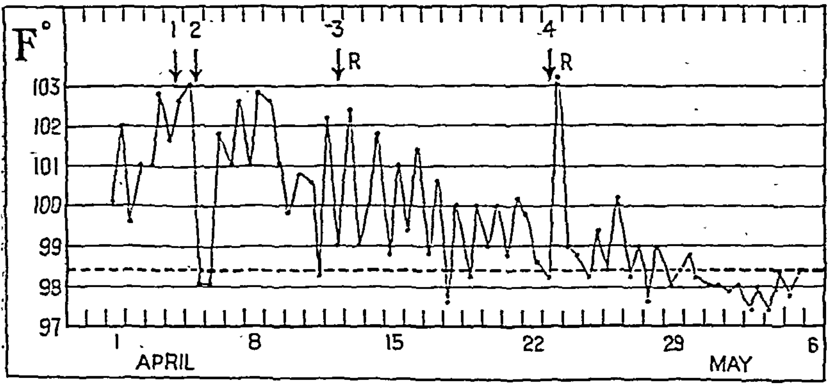
The attention drawn to the treatment of streptococcal septicæmia by articles in The Lancet of Feb. 24th and March 10th prompts me to record the following case.

Mrs. A., aged 39, was seen at St. Charles' Hospital on March 31st, 1933. Her last menstrual period had begun on Feb. 24th. She was found to be pyrexial, and a piece of tree bark was removed from the cervix by the medical officer on duty, who transferred her to a fever hospital as a case of septic abortion. She was, however, returned the following day as it was considered there that she had not aborted.

She was first seen by me on April 4th: temperature 101·6°; pulse 108; no vomiting; no rigors; bleeding from vagina; uterus enlarged; cervix admits one finger. Concentrated streptococcal (scarlet fever) antitoxic serum (Burroughs and Wellcome) 40 c.cm. was administered intramuscularly, and later, under a light general anæsthetic, the cervix was slightly dilated, several large pieces of placenta and membranes were removed with ovum forceps, the uterine cavity was explored digitally, and a hot intra-uterine douche followed by intra-uterine glycerin and pituitrin intramuscularly was given. There was considerable bleeding during the operation. An attempt to administer serum intravenously in the theatre failed; therefore on return to the ward the patient was given a further 60 c.cm. of serum intramuscularly, and treated for shock with morphia and subcutaneous saline.

April 5th: general condition very poor; very pale; temp. 103°; pulse-rate 118; no bleeding from vagina; hæmoglobin 41 per cent. Blood transfusion (350 c.cm. by Keynes's method), 50 c.cm. streptococcal antitoxic serum being given intravenously at the same time, by adding it gradually to the blood. The patient's temperature which had already been dropping since the morning was normal in the evening; pulse-rate 108; intra-uterine glycerin twice daily.



Temperature chart in streptococcal septicæmia. At 1 operation was performed and 100 c.cm. antistreptococcal serum was given intramuscularly. At 2 a transfusion was given and 50 c.cm. of serum was injected intravenously. Further transfusions at 3 and 4. R = rigor.

April 6th: general condition improved; temperature normal, rising to 101·8° in the evening; pulse 120; intra-uterine glycerin t.d.s., Blaud's pill grs. 30 t.d.s. April 7th: temp. 101°; pulse 114; lochia offensive; no vomiting; no abdominal pain. April 8th: temp. 101·4°; pulse-rate 120; respirations 28; nausea and headache; no physical signs in chest or abdomen; lochia very offensive; blood culture taken: growth of hæmolytic streptococcus reported on April 12th. Bluish-black area 3 in. by 2 in. on right buttock at site of intramuscular injection. April 9th: temp. 100° to 102·8°; pulse-rate 100–108; respirations 24; tender swelling over right scapula; Liveroid ½ oz. t.d.s. and ergot mixture prescribed. April 10th: temp. and pulse-rate dropping; discoloured area on buttock breaking down; lochia slight.

On April 12th the temperature had risen to 102·4°, with pulse-rate 120. Blood transfusion (500 c.cm. by Keynes's method) was done and there was a rigor immediately afterwards. Intra-uterine glycerin stopped. April 13th: temp. normal; pulse-rate 112; large sloughing area on buttock. April 15th: deep-seated abscess in region of scapula incised. April 17th: abscess right ankle incised; pus from abscesses reported later to contain *Streptococcus hæmolyticus longus*

On April 19th the temperature was still raised intermittently up to 100°; pulse-rate 90–100; very pale; no lochia. The abscess in the scapular region had tracked down the back and further incisions were made. A large deep ulcer was present on the right buttock. All wounds were irrigated or packed with eusol. On the 20th a large abscess on right buttock (below the level of the ulcer) was incised, and an abscess on the right side of head was drained. A blood count showed: red cells, 3,500,000; hæmoglobin, 46 per cent.; colour-index, 0·66; white cells, 8000; some anisocytosis, poikilocytosis, and a considerable amount of polychromasia seen in film; Arneth count shift to left.

When this blood count was reported on April 23rd, blood transfusion (400 c.cm.) was done. A rigor followed 20 minutes later. April 25th: temp. 98·8° to 99·4°; pulse-rate 90–100; all suppurating areas granulating well. April 26th: abscess right postero-axillary fold incised. May 8th: temperature normal since April 28th, but pulse-rate still 92–100. Blood count: red cells, 4,800,000 hæmoglobin, 64 per cent.; colour-index, 0·66; white cells, 13,000.

The patient's general condition continued to improve and the temperature remained normal; the pulse-rate also dropped to normal from about May 23rd, when all the wounds had healed and the excavated area in buttock had nearly granulated over. She was discharged on June 17th completely cured.

COMMENT

One is tempted to conclude that the administration of the streptococcal antitoxic serum played at least some rôle in limiting the progress of the infection, so that the septicæmia "became localised." The wound in the buttock, presumably due to trauma during the intramuscular injection in tissues devitalised by the general condition of the patient, may, in addition, have acted as a fixation abscess. It is my belief, as the result of experience in other cases, that it is important to *flood* the patient with serum *as early as possible* by giving a very large dose intravenously; but to obviate accidents due to hypersensitivity an intramuscular dose should be given three or four hours before. If an intravenous injection is given at once it is advisable to use a funnel and tubing, run in saline first, then add a drop of the serum (which is thus administered in very great dilution), and watch for symptoms indicating hypersensitivity. If all goes well, the amount of serum can gradually be increased till it is used full strength. It is hardly necessary to add that careful inquiries should always first be made in every case for a history of asthma, urticaria, and the like, and of previous administration of horse serum.

Personally I believe that 40 c.cm. of serum intramuscularly, followed by 60 c.cm. intravenously, is the average dose to employ as a routine in these cases.

I am indebted to Dr. Basil Hood for permission to publish these notes; to Mr. Arthur Gray, who was called into consultation; and to Dr. G. W. Goodhart for the pathological reports.

INTESTINAL OBSTRUCTION

WITH AN UNUSUAL CAUSE

By Tina Gray, M.B. Glasg.

DISPENSARY SURGEON AND HALL TUTORIAL FELLOW IN SURGERY, GLASGOW ROYAL INFIRMARY

On Jan. 17th, 1934, a woman aged 68 was admitted to Prof. Paterson's wards in the Glasgow Royal Infirmary with all the signs of acute obstruction.

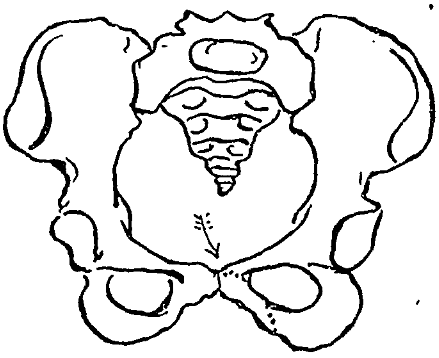
The history was as follows. On the evening of Jan. 16th she had been accidentally knocked down by a schoolboy. She fell, injuring her left side, but managed to get up and walk to her home, to reach which she had to climb two flights of stairs. She was seen by her doctor, who could find no definite sign of fracture and advised her to rest in bed: her complaint was that she felt her "inside being dragged," and not of pain. During the night she began to vomit, and the vomitus gradually changed from watery green to foul-smelling dark fluid. The patient, attributing her sickness to gall-bladder trouble, was not unduly alarmed. From the time of her accident her bowels did not act, and no flatus was passed; previously her bowels were regular. There was no discomfort with micturition and the urine contained no abnormal constituents. Immediately she was seen by her doctor on the 17th she was sent in to hospital.

When examined on admission, the patient, a frail old lady looking desperately ill, was found to be mentally very alert, and though articulation was difficult owing to the dryness of her tongue she gave her history accurately and was inclined to be rather voluble. Her general appearance was toxic. On examining the abdomen she was found to be profoundly emaciated, the skin of the abdomen having that sallow, waxy transparency so often seen with malignant disease. Distension was not marked, but peristalsis was obvious. The symphysis pubis seemed unduly prominent even for such a scaphoid abdomen, but there was no discoloration to suggest extravasation of blood. On palpation the abdominal wall was lax, and she complained of only slight general tenderness. Palpation of the symphysis pubis and left pubic ramus elicited tenderness; but no irregularity of contour could be made out. The vomitus was fæcal. The cachectic appearance of the patient suggested obstruction from malignant disease rather than an abdominal catastrophe due to accident.

Morphia and ephedrine were administered and she was taken into the theatre. When giving the spinal anæsthetic (3 c.cm. of 5 per cent. novocain) I found that she had a very definite lumbar scoliosis. The cerebro-spinal fluid was not under tension.

On opening the abdomen in the median line below the umbilicus, coils of distended jejunum presented. Following the distended loops I came on what at first seemed a firm adhesion to the symphysis pubis. On palpating a definite oblique ridge could be felt running downwards and outwards diagonally to which the bowel was attached. On shining a light into the pelvis a compound fracture of the left pubic ramus could be made out, into which the intestine was firmly wedged (see Figure), the entering loop distended, the other collapsed and worm-like. The peritoneum in the region was purplish and œdematous. It required a strong periosteal elevator to lever the fracture open so as to free the gut. The whole lumen and the edge of the mesentery had been caught, the ptosed condition of her viscera making the accident possible when the fracture gaped. The bowel was perforated in several places by the bone, and when the loop was delivered outside the wound liquid fæces poured from it.

I had to resect about 1½ in. of mangled gut and do a lateral anastomosis, closing the abdomen with drainage. Towards the end of the operation the patient's pulse became very feeble and pituitrin had to be given. She was returned to bed and the shock blanket applied.



The fracture followed the dotted line, and the bowel was caught at the point indicated by the arrow. (From a radiogram by Dr. A. Bruce-MacLean.)

Strychnine and digitalin and rectal salines were given four-hourly through the night.

The patient was definitely improved in the morning. Vomiting ceased after the operation. Her tongue was still very dry and she complained of thirst. Additional to water by the mouth, I gave her 600 c.cm. of glucose saline intravenously. Her bowels moved twice on the 18th after intramuscular injection of acetylcholine. The abdomen was slack, her tongue became moist, and her pulse improved in rate and quality. The improvement, however, did not last. She was rather restless through the night and collapsed in the early hours of the morning, and remedies proving useless she died on Jan. 19th.

I am indebted to Prof. Peter Paterson for permission to publish this case. I have not been able to find a similar one on record.

MEDICAL SOCIETIES

NATIONAL ASSOCIATION FOR THE PREVENTION OF TUBERCULOSIS

THE twentieth annual conference of this association, held in London on June 14th to 15th, discussed from many sides the

National Tuberculosis Scheme

of which we now have 21 years' experience. Sir HILTON YOUNG, who, as Minister of Health, inaugurated the conference, Viscount ASTOR who gave the opening address, and Sir ROBERT PHILIP, who presided, outlined the initiation, progress, and results of the work, leaving it to Dr. A. S. MACNALTY (senior medical officer, Ministry of Health) to fill in details from the public health and medical aspects. While the public, he said, still needed to be informed of the early signs and symptoms of tuberculosis, the outlook on the tuberculosis problem had been greatly changed by the realisation of the social and biological implications of the disease, and the appreciation of the fact that all measures directed towards the health and improvement of the nation generally were important contributions towards the prevention of tuberculosis. He brought forward two suggestions for special consideration in the national scheme: greater attention to contacts, and adequate provision of after-care. Dr. NOEL BARDSWELL (principal A.M.O., L.C.C.), in a survey of tuberculosis administration in London since 1913, drew attention to the L.C.C. scheme of boarding out children from infected homes, and to the provision made for the chronic ambulant, destitute, or homeless patient, in institutions such as Preston Hall.

Sir JOHN ROBERTSON (Birmingham) drew attention to the figures given by the Registrar-General in his last decennial summary (1921–23) of the comparative mortality from tuberculosis among employed and retired men between the ages of 20 and 65. These figures indicated that mortality from all forms of tuberculosis was two and three-quarter times as great among the unskilled as among the middle class, and that the mortality among the skilled artisan was nearly double that of the upper and middle class. This uneven distribution called for investigation; much greater care, he thought, should be taken for contacts in some areas. Young contacts should be kept under observation for as long as five years, facilities being available for those who needed special treatment. He would like to see a number of industries employing young persons—e.g., clerks and shop assistants—brought under the purview of the Home Office with a view to the establishment of more wholesome conditions of work.

THE DISPENSARY UNIT

Dr. G. **Lissant Cox** (Lancashire) discussing the dispensary unit—a better term, he thought, than tuberculosis dispensary—urged as a fundamental necessity that it should work in close association with the institutional unit. This was best attained when a graded medical staff controlled the united work. The disunity of the two sides of tuberculosis work—institutional and dispensary—was illustrated in London, where two separate authorities controlled them. One or other should control the whole. The most complete unity was achieved when the tuberculosis or dispensary officer and his assistants were in charge of a small institution, say 50 beds, in the area of the dispensary unit, each unit serving an area containing 200,000 to 300,000 in population.

Dr. D. **Melville Dunlop** (Edinburgh) recalled that the Departmental Committee of 1912 had laid it down that the dispensary should be a receiving house and centre of diagnosis. This it could only be if it commanded the confidence of the practitioners of the neighbourhood. The tuberculosis officer in charge should be a real specialist in tuberculosis, and not a medical Pooh-Bah. He should have full facilities at his disposal for making a difficult diagnosis, and sufficient time to make such a diagnosis accurate. No one could examine many new cases carefully at one sitting; in many dispensaries, not excluding his own, the hours were too short and too crowded, the dispensary being regarded by many as a sort of general out-patient department for the cure of coughs. Inflated attendances at dispensaries should be discouraged, (*a*) by omitting symptomatic treatment and concentrating on treatment of a specific kind—e.g., sanocrysin or tuberculin therapy, A.P. refills in certain definite cases; (*b*) by discharging the chronic bronchitic or asthmatic cases who came in shoals to the dispensaries for a chat and a bottle of cod-liver oil; and (*c*) by delegating to the home-doctor the observation of ex-institutional cases, to be seen at definite intervals by the tuberculosis officer. Properly paid officer and staff and adequate equipment demanded an outlay which might be prohibitive to small administrative units; he agreed that the solution was the provision of larger units. He felt strongly that the examination of contacts, particularly children, was among the really important functions of a dispensary. The weakness of the present-day position was the concentration on pronounced pulmonary lesions. But the tuberculosis officer interviewing the family might discover "delicate" children with a strong positive tuberculin reaction, who, though not suffering from pulmonary tuberculosis, were none the less suffering from the results of tuberculous infection; steps might be taken to forestall the visceral manifestations of the disease. Dr. Dunlop regretted that the tuberculosis dispensary and the school medical service were not in closer touch; the dispensary might well become an educational centre not only for the patient and his family, but for the medical student.

RESIDENTIAL INSTITUTIONS

Dr. **James Watt** (King George V. Sanatorium) said that two great factors were responsible for the revolution which had taken place in the residential treatment of tuberculosis of the lungs: the vastly improved technique of X ray photography which had relegated the stethoscope to a place of secondary importance, and the development of collapse therapy. All this had changed the character of the sanatorium from that of a convalescent home to that of a hospital complete with operating room, surgeon, and visiting specialists. The percentage of bed cases had risen from 20 to 50 per cent. or more, necessitating a standard of one nurse to six beds. The practice of graduated work by sanatorium patients had steadily become less common, although the value of occupational therapy was fully recognised. Nursing had greatly improved; systematic training in tuberculosis nursing, tested by examination at the end of a two-year course, was now available at most important sanatoria.

Dr. R. C. **Wingfield** (Frimley) said that much of the excellent work of the sanatoria was being wasted because there was not a close enough personal link between them, the tuberculosis officer, and the general practitioner. In the old days the sanatorium was an independent unit, and stood out as the only method of dealing with pulmonary tuberculosis. This independence and pre-eminence had been mistakenly perpetuated in most developments of the national scheme. The tuberculosis problem could only be solved by efficient coöperation in which the dispensary with its work in the field was the chief unit, the hospital and sanatorium definitely taking a subsidiary place. The present tendency to starve the dispensaries for the benefit of the sanatorium was unsound scientifically and uneconomic in practice. Any local authority that wished to tackle its tuberculosis problem efficiently must be prepared to spend at least as much on its dispensary as on its institutional service.

Dr. J. B. **McDougall** (Preston Hall) said that the meagre financial resources available for the bulk of after-care committees had frequently been one of the causes of their ceasing to function. After-care, using the term in its widest sense, had made less progress in point of efficiency than any other branch of the anti-tuberculosis scheme; the relapse of the patient might not be the fault of the sanatorium. It was, in fact, still to be learned that after-care was treatment, without which it was impossible to obtain the best results in at least half the cases. The essential object of the village settlement was to bring active disease to a state of arrest for a period sufficiently long to reduce to a minimum the liability of relapse. It was not a centre for the employment in perpetuity of arrested cases. Dr. McDougall thought the time had come for the N.A.P.T. to ask local authorities to choose between the schemes attempted with more or less success in this and other countries for the medical and economic benefit of consumptive patients. Knowing that after-care was sound clinical medicine, they should ask for larger contributions from national and local exchequers.

COÖRDINATION

Dr. H. P. **Newsholme** (Birmingham) indicated some of the channels of coördination which were desirable under the conditions of a large city. In Birmingham, where they had made the tuberculosis service into a unit, self-controlled and adjusted to an extent perhaps unusual in national tuberculosis schemes, there was a high degree of coördination between the sanatorium and the tuberculosis dispensary, in its character of clearing house. All admissions and transfers were arranged from the dispensary, whether it was a question of beds for sanatorium and hospital cases, for children, for surgical tuberculosis or for observation, including the transfer of tuberculous patients to and from general and special hospitals, municipal and voluntary. This reduced to a minimum the wastage from unoccupied beds.

REVIEWS AND NOTICES OF BOOKS

Investigations into the Causes of Mental Deficiency

By H. O. WILDENSKOV, M.D. London: Humphrey Milford, Oxford University Press. 1934. Pp. 113. 5*s.* 6*d.*

RESEARCH into the family histories of mentally defective patients is being carried out by an increasingly large number of workers in different countries. Systematic inquiries on these lines, however, in which each family is investigated with equal thoroughness, occupy much time. Few medical officers are able to carry out such researches, and, if they do, the work must extend over a period of many years. Dr. Wildenskov, who is medical superintendent of the Keller Institution in Denmark, has now published the results of five years of careful study. Fifty feeble-minded children and 50 idiots or imbeciles were chosen as *propositi;* naturally, larger groups would have been more spectacular, but the care with which these small ones were studied compensates for the absence of greater numbers.

Dr. Wildenskov started with the hope that he would obtain information on the question of the cause of mental deficiency in each case studied. Though he has not been successful in doing this, the data he has presented form a valuable background for future work. In each group of 50 children he investigated the incidence of dullness, feeble-mindedness, imbecility, and idiocy among the relatives. It is to be noted that the term "oligophrenia" includes dull as well as defective individuals, and that it can be applied to anybody with an I.Q. below 90. Comparison of the two groups shows striking differences. For example, oligophrenia was much more frequently found among the parents and sibs of high grade or special school-children than among the corresponding relatives of low grade patients. For special school-children about 50 per cent. of the sibs were oligophrenic; for idiots only about 25 per cent. were oligophrenic. Similarly, for high grade mentally defective children, 37 per cent. of the parents were considered oligophrenic, whereas, for low grade children, only 12 per cent. of the parents came into this category; even when cases of obvious secondary amentia among the idiots were left out, not more than 15 per cent. of the parents were oligophrenic. The same type of phenomenon was observed when more distant relatives were investigated.

These results are introduced by a careful survey of the literature on the ætiology of mental deficiency. Dr. Wildenskov shows that there is a consensus of opinion that inheritance, traumata, and inflammatory conditions of the brain are causal factors. There is no agreement, however, about the ratio of distribution of these causes. Authorities disagree about the importance of syphilis and alcohol. It is pointed out that the traditional division of cases into primary and secondary amentia needs revision, and that the combination of hereditary and acquired amentia is common. Many investigators have expressed their opinion that exogenous causes play a greater part in the causation of idiocy than in the causation of feeble-mindedness. This view was expressed in the Wood Report, and can be traced in the writings of Larsen, Szondi, and many others. There can be no possible chance of settling what percentage of patients is due to exogenous causes in any grade until there is agreement about what are to be the criteria of hereditary influence. In presenting the results of his researches, Wildenskov leaves this point undecided. His material undoubtedly shows that the incidence of defect is greater in the families of the high grades than in the families of the low grades, but if the families of the *propositi* are grouped according to whether one or both parents are oligophrenic the difference in familial incidence among the children, for high and low grade *propositi*, is scarcely significant. We are almost forced to the conclusion that, if the incidence of defect among the children of defectives is a criterion of hereditary influence, heredity must be almost as potent a cause among low grade as among high grade cases. Is it not possible that the phenomenon which Wildenskov, in common with so many observers, has noticed is partly due to the selection of cases who enter institutions? The remainder of the effect might be due to the fact that low grade patients seldom themselves have children, and that recessive characters are more likely to be discovered among the low grades.

The monograph is a stimulating and original piece of work, and it is obvious that no trouble has been spared in order to arrange the data in a useful way. The subsidiary problems, such as the incidence of epilepsy among sibs of defectives and the diagnosis of amentia due to trauma or cerebral infection, are treated in an interesting way. Dr. Wildenskov concludes by saying that he thinks future work on mental deficiency ought to be based on material that is uniform as to the degree of defect. A good bibliography of recent papers on the subject is supplied.

Diseases of the Eye

Seventh edition. By Sir JOHN HERBERT PARSONS, C.B.E., D.Sc., F.R.C.S., F.R.S., Consulting Ophthalmic Surgeon, University College Hospital; Consulting Surgeon, Royal London (Moorfields) Ophthalmic Hospital. London: J. and A. Churchill. 1934. Pp. 695. 18*s.*

IN its seventh edition this popular text-book retains its character of a sound conservative statement of all branches of ophthalmology. The subject matter includes anatomy, optics, the neurology of vision (a strong chapter this), methods of examining the eyes (the slit lamp is mentioned but not described in detail), many chapters on diseases of the eye and its adnexa, ocular disorders of motility, ocular manifestations of diseases of the nervous system and of other diseases, and finally on the causes and prevention of blindness and the hygiene of vision. Possibly in the next edition some information on the certification of blindness might be added. Recent advances are noted but the advanced student will have to turn to more specialised works for detailed descriptions. The chapter on physiology has been largely rewritten in this edition; it is devoted mainly to a discussion on the formation of the intra-ocular fluid and its relation to intra-ocular pressure. The dialysation theory of Duke-Elder is favourably considered, the conclusion reached being that both dialysation and filtration play a part in the formation and disposal of the intra-ocular fluid and the maintenance of intra-ocular pressure. In the chapter on glaucoma the pathology is discussed on orthodox lines, the chief stress being laid on interference with filtration at the angle of the anterior chamber. The student who reads the chapter on detachment of the retina might hardly realise how greatly the prognosis has improved since the discovery by Gonin of the importance of retinal holes and of the methods of closing them.

The statement in the text that the best of these methods is probably diathermy will be fully endorsed by ophthalmologists.

This work retains its vitality, and the student who adopts it as his main text-book on ophthalmology is not likely to regret his choice.

Le sinus carotidien et la zone homologue cardio-aortique

By C. HEYMANS, Professeur de Pharmacologie et de Pharmacodynamie à l'Université de Gand; J.-J. BOUCKAERT, Professeur de Thérapeutique générale à l'Université de Gand; et P. REGNIERS, Agrégé de l'Université de Gand. Paris: G. Doin et Cie. Pp. 334. Fr.55

THIS valuable monograph is a synthesis of the principal facts established concerning the rôle of cardio-aortic zones together with a detailed account of the recent researches conducted by the authors at the Gand University. The problem has been approached from various aspects, and detailed and careful records are given which should be extremely useful. The book is divided into five sections. The first part deals with the morphology of the carotid sinus and cardio-aortic zones not only in man but in a large group of animals. The next section is concerned with the physiological functions of these zones under the headings of their relation to the circulation and to the activity of the respiratory centre; thei reaction to physiological chemical substances, as fo example Ringer's solution charged with CO_2 or insufficiently aerated blood; their influence on other physiological functions, as for example on the gastro-intestinal, ocular, and pupillary reflexes; and finally their influence on the equilibrium of the autonomic and sympathetic systems. The third section deals with the pharmacological aspect of these zones, most important from the point of view of the physician and the anæsthetist. To give one small example of its clinical bearing, it appears that the cardio-inhibitor reflexes are intensified during chloroform or ether anæsthesia; this is of particular moment in operations on the neck, particularly in cases of hyperthyroidism where the surgeon may by traction on the gland excite the carotid sinus reflex and produce hypotension and strong cardiac inhibition. The fourth section deals with the principal factors, physiological and pathological, which may modify the reflex function of the cardio-aortic and carotid sinus zones, also the effect of section of the nerves which innervate them. The final and most important chapters discuss the clinical aspect of these zones. A correlation is attempted between experimental findings and clinical conditions. We are still, however, only on the fringe of discovery as to the workings of these reflexes, and the practical application of most of the research described is still to seek.

EUGENICS IN PRACTICE

A Series of Essays suggested by the Report of the Brock Committee

VII.—THE POLITICAL OUTLOOK

LEGALISATION of eugenic sterilisation in this country has been definitely "put on the map" by the first recommendation of the Departmental Committee which runs:

> "Subject to the safeguards proposed, voluntary sterilisation should be legalised in the case of: (1) a person who is mentally defective or who has suffered from mental disorder; (2) a person who suffers from, or is believed to be a carrier of, a grave physical disability which has been shown to be transmissible; and (3) a person who is believed to be likely to transmit mental disorder or defect."

It may be well to consider what appears to be the prospect of legislation upon this subject. Political prophecy is always a hazardous business, never more so than in these times when so many events without precedent or probability occur, and when domestic no less than world politics are subjected to turns of the wheel of fortune such as no man could have anticipated as being even remotely possible a decade ago. There is a further factor for which allowance must be made in trying to form this estimate, which is that the opinion of any would-be prophet is liable to be subconsciously influenced—more upon this subject than upon most—by his or her personal views in the matter, so that the wish is very liable to be the father of the thought.

GROWTH OF PUBLIC OPINION

The objector to sterilisation, who usually takes an uncompromising stand upon religious grounds, will assert that the operation is so immoral that its legalisation is unthinkable, and that such is the organised voting strength supporting his point of view that no Government will dare to risk taking action. The person, and especially the recent convert to the idea, who sees in the sterilisation of hereditary defectives a clear road to social progress, and to a substantial reduction in the sum of human misery, tends to under-estimate the difficulties, political and legislative, and to become an enthusiast who notes the rapid growth of favourable public opinion and concludes that the time is ripe for parliamentary action.

The growth of opinion in favour of sterilisation has certainly been very remarkable during the last few years. Although the two subjects can only be indirectly connected, there is no doubt that it is the almost universal spread of the knowledge and practice of birth control throughout the population that has paved the way for interest in sterilisation, and has created a public which is receptive to what would only a few years ago have been regarded as unthinkable. The present-day readiness to consider sex problems as natural and to be discussed in a rational manner has, of course, played its part. Not long ago, even among educated and thinking people, few had even heard of sterilisation except by castration, or were ready to give the question of human sterilisation serious consideration even if it were brought to their notice. So far as serious consideration was concerned this applied even to the bulk of the medical profession. To anyone who was interested in the subject in those now seemingly remote days the change that has taken place, and is taking place, in public opinion is nothing short of miraculous. Publication of the Brock report has crystallised the issues. What had so recently been the vague beliefs of a few people commonly regarded as cranks, supported by evidence of doubtful reliability, and by statistics not fairly comparable to British data, received the endorsement of an impartial and weighty committee after a thorough and objective survey. While some previously held views had to be modified, others were reinforced; while some old evidence had to be discarded, much fresh and weighty evidence was produced. But at least the protagonists of eugenic sterilisation could feel for the first time that they stood upon indisputably firm ground.

PARLIAMENTARY PROCEDURE

It is interesting to look back at the first attempt to bring the question before Parliament. On July 21st, 1931, Major A. G. Church, then a member of the Medical Research Council, introduced from the Labour Benches a private Member's Bill under the rule which allows two speakers, one for and one against, both limited to 10 minutes. This Bill, which sought to legalise voluntary sterilisation for mental defectives, was rejected by 167 to 89, with voting irrespective of party. A Bill introduced under the "10 minutes' rule" has in reality a negligible chance of being passed into law if it is faced with the slightest opposition. Indeed, the procedure is used mainly for propaganda, and for this purpose it is not so futile as it may appear to those critical or ignorant of parliamentary procedure. With very few exceptions only measures introduced by the Government of the day, with its full authority, and with a previously ascertained confidence of general assent from its supporters, stand any chance of becoming law. Many complaints are raised nowadays at the slowness of parliamentary procedure, but it may be doubted if many of those who complain realise the full implications of their demand for speedier action. Few will disagree that we suffer from too many, and not too few, laws. The existing practice, that at first glance may well appear to be so cumbersome, has in reality been evolved through the centuries with two main objects in view. First, to ensure that there shall be adequate opportunity for the discussion of all measures before they can be passed into law, and to ensure that no minority shall be ruthlessly overridden by a large or impetuous majority. Secondly, to fix the responsibility for all legislation upon the Government of the day. It is when subjects are brought forward that cut across ordinary party alignment, as where religious issues are involved, e.g., in divorce law reform, or in a reform of the gambling laws, that any Government is embarrassed and becomes hesitant. A party depends upon votes, and upon such issues votes can only be lost and not gained. Normal supporters may be disaffected, but normal opponents are not to be won over. The stormy passage threatening the recently issued Bill to deal with betting and lotteries is a case in point. In this case refuge had been taken in the usual Royal Commission. And had action of some sort not been forced upon the Government by such serious gaps discovered in the existing (and obviously obsolete) state of the laws as that which permitted the huge annual exit of money to Dublin over the Irish sweepstake, or by the discovery of certain interests that they could circumvent the law against the (promiscuous) use of their own totalisators, it can hardly be doubted that the issue would have still been shunned.

It is into this category of cross-party measures, and closely comparable with divorce law reform, that legislation upon sterilisation must be put. It may be safely assumed that an overwhelming majority would like to see a rational reform of the divorce laws. Yet they may not see it for many years. Sterilisation will probably be saved from such delay by reason of the greater weight of general public interests, as opposed to scattered private interests that is involved. But for this fact a resolute minority, even if small and diminishing, would certainly deter any Government from taking action, despite the fact that there is already in the House of Commons, and probably in the country, a majority in favour of action upon the lines of the Brock Committee. When Major Church's bill was introduced the Labour section of the Opposition in it fastened upon "class legislation" as being the line to take in the attack. I is probable that on the whole labour-socialis more advanced in favour of sterilisation than t opponents. But the average Labour Membe Parliament, or candidate, is far less free to ex his personal views, or to take the slightest risk, his conservative opposite number. In the pre vague state of opinion upon sterilisation in country few members of any party will gratuito risk losing even a few hundreds of votes. But it m be observed that in the few constituencies wh sterilisation has as yet been squarely put and expla to the electors, it has been very well received. H ever, in the same way that the belief has captured t imagination of so many Labour voters that a restr tion of births will tend towards raising the status o the wage-earner, so is a realisation spreading of t more easily established truth that unorganisable an (with exceptions) unskilled defectives—some approaching 250,000 of them in the labour mark to-day—are a drag upon wage standards and progress, a burden upon the social services.

ALLEVIATION OF FEARS

At the present time, omitting opposition upo religious grounds—which except perhaps in the cas of the Roman Catholic Church is rapidly declining—the cries of objection to legalising eugenic sterilisation that the politician fears are broadly three in number. First, "class legislation," a declining and surmountable objection. Secondly, the charge that it will not prove possible to maintain the voluntary character of the operation. Thirdly, that grave abuses will creep in, such as increased prostitution, promiscuity, or sex offences, and the spread of venereal disease. It will only be when the answers to these fears—all, of course, faithfully dealt with in the Brock report—have attained as wide a circulation as the fears themselves, that any Government will dare to introduce legislation. It is probable that the public will get clear upon these points much more rapidly than is generally supposed. Only those who have made it their business to feel the public pulse upon this subject over a period of years can appreciate how rapid is the quickening that is now taking place. Improvement in the means of ascertaining mental defect, and the increasing realisation of its extent, coupled with need for scrutiny of every item of expenditure, is converting local authorities and charitable organisations (though these latter hesitate to announce the fact) wholesale to taking a favourable attitude towards sterilisation as a way of reducing their burdens. The circulation of the Brock report has f exceeded anticipation. The medical and teachi professions have swung over and will increasing exercise their influence upon the public. There indeed, a danger that demands will be made to app sterilisation far more widely than sure knowled justifies, and with the expectation of results beyo the possibility of realisation. But the object less provided by recent German eugenic legislation help our own people to keep a proper sense proportion. The success of sterilisation in pract in Alberta, its progress in other dominions and the Scandinavian countries, will be closely watch in this country.

It is then to outside Parliament that we must loo at present in estimating the prospect of legislation Political action in this field as in others will follo and not lead public opinion. Unforeseen events ma hasten or delay enactment—the example of th Betting Bill is not without significance—but of legalisation of eugenic sterilisation is certain to em.

THE LANCET

LONDON: SATURDAY, JUNE 23, 1934

SUICIDE

THE problem of suicide is an insistent one in modern society. It has for many centuries been examined by moralists, physicians, and jurists. It is appropriate that it should now also hold the attention of statists and sociologists for they are closely in touch with those predominant burdens that contribute to the greater prevalence of suicide in our civilisation, especially among those who live in cities. The statistician of the Metropolitan Life Insurance Company has lately published a valuable contribution to this subject [1]; it may be supposed that he was led to this study by consideration of the fact that American life insurance companies paid over 75 million dollars in suicide claims during 1932. Access to the records of a very large insurance company has provided him with material from which it may be seen, as from the Registrar-General's reports in this country and other statistical data, that the frequency of suicide is influenced by a number of environmental factors of which industrial conditions are not the least important. But, as was pointed out recently in these columns, the exact relations between mental disorder and unemployment must be to a varying extent a matter of surmise. One cannot hope from statistics for a clear indication of the chief causes of suicide, but significant correlations emerge from these figures. How far racial and climatic peculiarities are responsible for variations from country to country is not clear, but such variations are notable. The highest rates are found in Germanic countries and Japan, the lowest in Spain and the Irish Free State. Where an authoritative highly socialised religion is widely observed, suicide is less common. Men are more prone to suicide than women, older people than young, white men than negroes, immigrants than settled inhabitants, and city dwellers than rural ones. The seasons, economic conditions, marriage, and religion all show a relatively high correlation with the suicide rate. It is very clear, for example, that the suicide rate in the United States has varied in close relation with the "business index" between 1910 and 1930. But from such a general finding Dr. DUBLIN refuses wisely to infer a simple causal relation.

The sobriety of statistical analysis is refreshing in a field where psychological conjecture is sometimes undisciplined, as may be seen from the latter, vaguer part of this book. It is incontestable that there are also inner or constitutional factors which are of equal importance with the environmental ones in determining suicide. There are so many circumstances in which suicide may be attempted, such a gulf often between the attempt and the lethal act, that no single explanation or simple cause can be sufficient. Those who deliberately, and it might be said rationally, act to avoid what would be unendurable, cannot be accounted for in the same way as an obsessional who yields to a suicidal impulse or a schizophrenic who obeys a hallucinatory voice. All of these are open to psychological study, from which much may be learnt, but there is still no psychological interpretation which covers all the phenomena. Many such interpretations are fanciful and cannot be verified, others provide the means for a useful estimate of the risk of suicide in a particular distance. The full interpretation of suicide must be a biological one, derived from a pooling of genetic, social, comparative, and psychological data.

The prevention of suicide is an urgent matter, for in this country as in many others the number of people who kill themselves is apparently increasing. Doctors have here an important part to play. Social and religious factors are not within their control except in so far as they are also citizens. But that large number, possibly the majority, of suicides who have sought medical advice for a mental illness, however mild or masked the suicidal aspect, must be regarded as a special responsibility. There is no doubt that ignorance of psychiatry is responsible for ill-judged advice sometimes given to patients who need hospital or at any rate skilled supervision. A sea-trip, an exhortation, or a placebo is no substitute for constant care and psychiatric treatment. Although it cannot be denied that in many cases the likelihood of suicide could not have been foreseen by the most experienced psychiatrist, there are others in which timely measures could have been taken. Fuller knowledge of the psychiatric indications is therefore much to be desired so that the doctor, without being an alarmist, can either warn relatives and advise treatment, or, it may be, reassure where there is needless alarm.

DIURNAL INCONTINENCE IN WOMEN

ONE of the most distressing sequelæ of damage to the pelvic floor in women is lack of complete control over the sphincter of the bladder, leading to incontinence of urine when walking, coughing, or engaging in other activities involving abdominal strain. Although the symptom is not unknown in young women and in those who have not borne children, it is much more commonly found in women over forty, especially in association with a history of frequent labours. The patient with incontinence may show evidence of cystocele, but, as is pointed out by J. THORNWELL WITHERSPOON in a recent communication,[1] it is quite usual for either condition to occur separately. Any severe degree of prolapse is, in fact, more likely to be complicated by retention of urine than by incontinence. Examination of the patient complaining of incontinence may reveal no abnormality until she is asked to strain in the squatting position. The characteristic displacement, as originally described by VICTOR BONNEY, is then a wheeling of the organs around and under the subpubic angle until the urethra comes to point upwards and forwards. Damage to the anterior wall of the vagina at the time of parturition may be caused by the forward pressure of the fœtal head; it may even be accentuated by efforts to save the perineum. This injury commonly involves the fascial supports of the bladder, but Witherspoon holds that the damage causing incontinence alone is at a different level from that causing cystocele alone. True cystocele is a hernia of the bladder between the fascial layers, and only when it is associated with weakness of the posterior aspect of the neck of the bladder and of the urethra is it likely to be complicated by incontinence.

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[1] To Be or Not To Be. A Study of Suicide. By Louis I. [illegible]n, Ph.D., and Bessie Bunzel, M.A. New York: Harrison [illegible] and Haas. 1933. Pp. 443. $3.50.

[1] Archives of Surgery, 1934, xxviii., 548.

The fascial sheath which surrounds and supports the bladder is a much firmer structure anteriorly, where the trigone and the anterior part of the bladder lie on it, than posteriorly, where it separates the bladder from the vaginal wall. In front there is a strong attachment of the sheath to the pubic bone and to the under surface of the fascia of the rectus abdominis and of the pyramidalis, and at the sides it is attached to the levator ani. The sphincter muscle lies embedded in the supporting structures of the trigone, so that injury to these structures is likely to involve the sphincter and the bladder neck. With such damage, caused as it commonly is by pressure from behind, there follows a relaxation of the neck of the bladder, a dragging on the fascial attachments to the pubic bone anteriorly, and a funnel-shaped deformity at the neck of the bladder. The sphincter is acting at a mechanical disadvantage and tends to be relaxed. A reflex nervous factor then complicates the condition, for, once a little urine passes the sphincter, immediate cessation of micturition is very difficult to achieve on account of an involuntary inhibition of sphincteric control. Weakness of the anterior vaginal wall is liable to produce the same funnel-shaped deformity of the bladder neck. The cervix may be pushed downwards piston fashion every time there is an increase in intra-abdominal tension and may cause a dragging action on the base of the bladder. Weakness of the perineum has not this effect, and from the point of view of treatment, it is important to realise that perineorrhaphy is powerless to cure incontinence, although, of course, perineorrhaphy and colporrhaphy should be combined with the operation for lack of sphincteric control where necessary.

The operation recommended by Witherspoon aims at narrowing the neck of the bladder and the urethra and establishing a "point d'appui" for the action of the sphincter. A curved incision is carried round the anterior lip of the cervix and another incision made at right angles to it. The base of the bladder is exposed by dissection. The urethra, and especially the position of the sphincter, is defined by insertion of a Pezzer catheter. By means of two tiers of mattress sutures the tissues of, and those adjacent to, the neck of the bladder are enfolded and imbricated on themselves. One stitch is carefully placed above the sphincter on the neck of the bladder. By means of the plication effected by these stitches the sphincter and the posterior urethra are narrowed. As much as possible of the musculo-fascial sheath below the bladder is preserved and this is imbricated on itself. The mucous membrane edges are trimmed and united. An in-dwelling catheter is employed for six to eight days, or, alternatively, the patient is treated by frequent catheterisation. The results which Witherspoon has obtained by use of this method have been encouraging. In 13 cases, he says, the end-results are as yet undetermined, but of 21 others, there are only 2 failures, 14 are cured, and 5 improved. He stresses the importance of early repair of any damage occurring at the time of parturition. This should, in his opinion, be carried out as soon as involution has taken place.

A MIRROR FOR DOCTORS

In the MacAlister lecture, printed upon another page, Dr. ROBERT HUTCHISON has brought together an anthology of literary references, complimentary or otherwise, to the medical profession. The apparent predominance of the uncomplimentary will cause neither anxiety nor surprise. Famous wits produce their most memorable pleasantries when a spice of malice seasons the epigram; and a single patient's misadventures give the cynics a better opportunity than ninety and nine cases that go not astray. As the lecturer observed, the statistical proportion of praises to dispraises is perhaps the less important, inasmuch as one side of the ledger tends to cancel out the other. Some of the disparaging remarks originated a long time ago in a less scientific age. We may hope, with Dr. Hutchison, that doctors have risen in esteem as they have gained in efficiency. It may be true, as he suggests, that the individual practitioner is better liked than the profession as a whole; criticism is mainly the result of inability to understand the medical attitude towards lapses in professional conduct and towards excursions into therapeutics by the unqualified. That the attitude is the expression of the intention of the law eternally escapes comprehension.

A recent writer scarcely encourages the medical profession in self-complacency. In "The Citizen and the Law" by "Solicitor"[1] a vivacious chapter is devoted to doctors. The author, though his anonymity prevents any comparison of his credentials with those of Lord MACMILLAN, who lately put in a kind word for the medical profession,[2] has evidently met the medical witness in the county court, at petty sessions, and before the coroner. While instructing the citizen in the law not only as it is but also as it might be, "Solicitor" frames a *general indictment against doctors*, even if he finds it his duty to mention certain circumstances in mitigation of punishment. Doctors, he says, have lost caste. Publicly they are praised and lawyers are reviled, but in private conversation the converse is apt to occur. Many of his adverse comments are connected with a similar contrast between the two professions of law and medicine. It is notorious, he says for instance, that medical experts will charge for giving evidence in workmen's compensation cases double the sum earned by learned counsel for conducting the whole proceedings; hence, he remarks, it is small wonder that doctors "are not so highly thought of as they used to be." Of medical remuneration in general he complains that the legal basis of fees—entitling the practitioner to whatever the jurymen think reasonable, regard being had to his eminence and the distance he has to travel—leaves doctors free to charge pretty much what they please. "The extent of what, if they were lawyers, would be called their extortions is limited only by competition among themselves"; in country districts the charges are sometimes "astounding." He adds, in words which will be reassuring to some of our readers, that it is generally useless to defend an action brought by a medical practitioner to recover his fees. "Solicitor" would be more than human if he did not point out that lawyers' bills can be reduced on taxation while doctors' bills cannot. He would like all doctors' bills to be reviewed by district commissioners, and he cannot see what valid objection the medical profession could make to his proposal. There are plenty of other counts in the indictment besides avarice. A brief reflection on unnecessary surgical operations is followed by allegations of abuse of professional secrecy. The standard here with regard to hospital patients is described as deplorably low. Doctors, it seems, collect information in the hospital wards which is afterwards used against the patient in workmen's compensation and accident cases. The worst offenders in this respect, says "Solicitor," are the eminent specialists who are retained by insurance companies and who, by using knowledge gathered in whatever hospital they adorn, have shaken the confidence of the working classes in our hospital system.

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[1] The Citizen and the Law. By Solicitor. London: George Routledge and Sons, Ltd. 1934. Pp. 249. 7*s.* 6*d.*

[2] See THE LANCET, May 19th, p. 1071.

"Solicitor" in support of these charges is without evidence which would stand an elementary cross-examination. Who are those eminent specialists, and what proof is there that their pliability has earned the distrust of the public? Again, what reductions in fees do solicitors give to clients who cannot afford to bring their distresses into the arena of the law courts without substantial help? It is considered reasonable for a solicitor to say, "I will not work unless I am paid," while anything approaching such an attitude on the part of the doctor is called callousness. Coroners' juries, if unfortunately an inquest should arise, are sometimes more pictorial in their estimate of the doctor's conduct. And when "Solicitor" speaks of the astounding charges made by eminent doctors for giving medical evidence, reasonable people, and especially people with legal minds, would suggest that if a particular specialist is invited to give evidence and a particular barrister is entrusted with a client's interests, the charges in either case will be high, and possibly those of Buzfuz will be higher than those of Firmin. "Solicitor" attributes a decline of the medical profession in public esteem partly to the introduction of the panel system, which has resulted, he says, in inferior care being bestowed on the less remunerative patients; he appears to be unaware of or unfairly silent upon the plight which those patients submitted to before the passing of the Act. Another cause of diminished prestige is declared to be the scandal of expert evidence. Here, as might be expected, we are told of the usual two eminent doctors who enter the witness-box and declare upon oath that there is nothing wrong with the workman and that work will be the best thing for him, though presently two equally eminent witnesses, also upon oath, state their conviction that any exertion on the workman's part will be certainly injurious and probably fatal. We all deplore this sort of discordant testimony, but medicine is admittedly not an exact science, and advocates search to bring about exactly the confusion described.

In case any should take "Solicitor's" comments too seriously, as from one qualified to criticise, we might add that evidence for qualification is lacking or even negative. For example, "Solicitor" states that vaccination is "often the cause of encephalitis lethargica," and cites, when speaking of the standard of professional skill and training, an anonymous general practitioner as an authority for the statement that any good plumber could be taught to be a surgeon in six months. We might perhaps have begun with this sample of "Solicitor's" capacity for writing accurately on the relations between the doctor and the public, and then have said no more.

MEDICAL MUSEUMS

THE International Association of Medical Museums was founded in 1907 and under the enthusiastic care of Dr. Maude Abbott it has done most useful service. The membership of the Association is not large: there are only 23 names under "Great Britain" in the list. But those who have a real passion for museum work are few, and for the most part pathological museums are rather perfunctory collections of bottled specimens which serve as texts for teaching and examinations. No museum however perfect can of course replace the assiduous study of the fresh post-mortem, where so much is learned from colour, texture, and substance. But there are many conditions with which it is desirable that the student should have at least some objective acquaintance which chance will not throw in his way, and no one who has seen such exhibitions as that of Dr. S. H. Daukes in the Wellcome building can doubt that all curators might with advantage reconsider their methods of presentation. No museum will be much good unless someone is putting his heart into its perfection and giving it the continuous loving care which it needs. And such an organisation as the International Association is valuable because it keeps curators in touch with what other devotees are doing elsewhere and with the technical methods which they elaborate. The last number of their publication—the *Journal of Technical Methods and Bulletin of the International Association of Medical Museums*—issued from McGill University in Montreal announces some changes in policy. The journal will in future be issued regularly once a year and its scope will be more strictly limited to museum and pathological technique with, we are glad to see, the congenital abnormalities of the heart in which Dr. Maude Abbott has so happily specialised. The number contains a great deal of interesting information and provides much and varied proof of the value of the work which the International Association has done and proposes to do.

ANNOTATIONS

REGISTRATION OF FOREIGN DOCTORS

NOT long ago we gave an account of the first year's working of the Academic Assistance Council in its task of assisting university teachers and investigators unable to carry on their work in their own country on grounds of religion, political opinion, or race. Assistance was not confined to German exiles, and the resources of this council enabled it to make maintenance grants to 49 scientists or scholars and to place 129 others. It was no part of this council's task to help medical men with foreign qualifications to find openings for practice in this country. It is however well known—and has been the subject of some adverse comment—that the Conjoint Board of Scotland is enabling a number of these foreign doctors to take the final qualifying examination after a short course of study. It was reported to a council meeting of the British Medical Association on June 6th that about 180 foreign doctors are availing themselves of this concession, and the chairman of the B.M.A. council said it was expected that about 150 of them would remain in Great Britain and Ireland, where an attempt would be made to place them in cities where there is a large Jewish element. Of the remainder some, he said, might go to South America, but there was every reason to believe that not a single one of them would find his way to Australia, New Zealand, or South Africa. They themselves had no money, and there was no body which had the funds necessary for the payment of passage money. The practical problem was therefore not that of safeguarding the Dominions and Colonies from inundation, but of dealing with at most 150 medical persons who would be settling in this country during the next 18 months for such period as the Home Office would allow them to stay. The Dominions Committee of the B.M.A. expressed the opinion that it was desirable to increase to three years the period of study in this country required before admission to a final qualifying examination.

THE PRODUCTION OF ARTIFICIAL PYREXIA

WE have recently considered in these columns [1] the thermostatic control of the warm-blooded animal and some of the outcomes of the attempt to evade this control and to produce artificial fever, local or general. It is important to be aware of the nature of the agencies employed. Until recently the term "diathermy" was limited to the production of heat in the human body by the passage of oscillating currents with a frequency of about 1,000,000 a second. These were generated by the discharge of a condenser through a coil of suitable inductance, or in some of the newer machines by causing a thermionic valve to generate oscillations. The mechanism in the latter case is more difficult to understand than in the simple spark machine, but it is analogous in some degree to the action of the balance wheel or pendulum of a clock. In the simplest arrangement, two circuits each containing an inductance and capacity are connected to the appropriate electrodes of the valve, and are at the same time so situated that they are inductively linked with one another. In this state any slight variation in one circuit will produce an enhanced variation in the other, owing to the amplifying properties of the valve. This induces a second impulse back into the first circuit, and under suitable conditions the valve will break into a sustained oscillation which continues as long as power is supplied to the circuit. The frequency of the oscillations produced depends entirely on the electrical constants of the circuits employed, but the intensity of the high-frequency circuit is a function of the size of the valve and its capacity for taking reasonable power without overheating. In recent years there has been considerable investigation of the action of currents of still higher frequency, of the order of 10 million a second. Such currents have been obtained from valve outfits almost exclusively, though one type of spark instrument suitable for local treatment has been made in this country. When such high frequency is in use, the patient is placed between two insulated plate electrodes which are not in contact with the skin, the tissues of the body forming part of the dielectric of a condenser. Smaller plates are used when local treatment is intended. In another form of instrument recently devised, the Inductotherm, the currents are produced in a flexible insulated cable which is wound round the body or part to be treated. Such an arrangement would lead to a different distribution of the induced currents, but there is no essential difference between the two methods. In both cases the observed rise in temperature can be regarded as the result of induced currents of high frequency in the body. Merriman, Holmguest, and Osborne [2] maintain that there is a difference in conductivity of various tissues towards these new currents as compared with diathermy, but it would be premature to deduce this from the results of experiments in which the methods differ so widely in detail. There is some difficulty in finding a suitable term for the description of the new therapeutic agent. In America the word "radiothermy" has been suggested as being the production of heat by currents such as are used in wireless telegraphy. But the term might lead to confusion with radiant heat. There is a tendency to lay emphasis on the presence of electro-magnetic radiation as being the heating agent, which does not seem to be justified by consideration of the machinery used. The fact that the frequencies in question are the same as those used in so-called short-wave wireless has suggested the term "short-wave diathermy." While this may not satisfy everyone, the term is convenient and it emphasises the relationship of the new agent to the original diathermy current.

HÆMATOPORPHYRIA

A RECENT number of *Medicine* (Baltimore) contains a very complete review [3] of this rare but interesting condition, together with an account of two cases which came to autopsy and offered material for the study of the nature of the histological changes in the nervous system. After explaining that hæmatoporphyrin is not actually the pigment involved (for only uroporphyrin and coproporphyrin are found in the urine), the authors distinguish four types of the disease—chronic, congenital, acute toxic, and acute idiopathic. The first two are characterised by the development of certain skin lesions on exposure to light, and the last two by symptoms resembling Landry's paralysis so closely as to suggest the advisability of a careful spectroscopic examination of the urine in all such cases. It is an interesting question, which is not finally settled, whether drugs such as sulphonal can actually produce hæmatoporphyria, or whether they merely act as exciting causes in persons already exhibiting the disease in a latent form. While the chronic types are relatively benign in character, the prognosis in the acute forms is bad. No treatment appears to be of any avail, but calcium is recommended on theoretical grounds. The origin of the pigments is still uncertain. The older theory of a disturbance of hæmoglobin katabolism is questioned by Fischer, whose work makes it extremely probable that neither uroporphyrin nor coproporphyrin can be derived from hæmoglobin. It would appear that they are synthesised from ingested pyrrole compounds, principally by the bone-marrow. This is a process which normally occurs only to a slight extent, but is much more prominent in fœtal life and in certain birds; it probably represents a stage in the synthesis of hæmoglobin. The suggestion is of a reversion to a more primitive level of pigment formation, in fact a kind of atavism. This theory, which implies perhaps the lack of specific enzymes, agrees well with the observation that congenital hæmatoporphyria is usually inherited as a Mendelian recessive.

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[1] THE LANCET, May 19th, p. 1075, and May 26th, p. 1129.

[2] Amer. Jour. Med. Sci., May, 1934.

[3] Mason, V. R., Courville, C., and Ziskind, E.: Medicine, 1933, xii., 355.

MENTAL DISORDER ASSOCIATED WITH PREGNANCY

It has generally been believed that the insanities occurring in association with pregnancy have a good prognosis, but clinical studies of any large series of cases are hard to find. Dr. C. B. Bamford has recently analysed[1] the 97 cases admitted into the Rainhill Hospital between 1883 and 1933. He believes that these psychoses only form one-tenth of the insanities associated with reproduction, and he also concludes that in 60 per cent. of his cases some form of mental disability was present before conception. Of the 97 cases, 25 were defectives or epileptics; schizophrenic or manic depressive signs had already manifested themselves in 23 cases before the outbreak of those serious abnormalities for which detention became necessary. The determination of the point at which mental disease actually began was by no means easy, and it is perhaps surprising that 35 per cent. of the patients, including half the epileptics, made a complete recovery. The absence in the series of any evidence of a toxic or exhaustive factor is striking, and it points to one essential difference between gestational and puerperal cases. In the former, constitutional factors and previous signs of faulty stock are to be expected; in the latter it is toxæmic concomitants which are generally easy to find. That a psychopathic inheritance was only recorded in 17 cases may well be due to lack of interest in this matter in the earlier period covered by the review; it would be difficult to believe that unstable heredity was present in less than 20 per cent. of these potential psychopaths. Dr. Bamford notes that confusion was present in 23 of the 34 recovered cases and compares this finding with the absence of recorded exhaustion or intoxication. It seems clear that the altered metabolism of pregnancy precipitates mental disorder in suitably constituted persons as it produces eclampsia in others differently constructed. All the cases were much worse at the time of delivery and most of them only began to improve after the second month. In view of the recovery-rates, Dr. Bamford questions whether premature termination of the pregnancy is advisable. In the Rainhill series it was never attempted. What is of present-day interest is the high percentage of psychopaths among the cases, and the question of limiting fertility naturally arises. Whilst the prognosis appears good it is less so than is commonly taught.

RUNNING AND WALKING

At full speed a champion sprinter attains a velocity of 23½ miles per hour, a performance which compares not unfavourably with the racehorse's 36 miles per hour. It must be conceded, however, that the quadruped maintains this speed over the Derby course of a mile and a half; a runner over the same distance would be capable of an average rate of about 13 miles per hour. The fastest walking recorded, half a mile in three minutes, illustrates the comparative inefficiency of this method of progression. A first-class long distance runner can continue at that rate for over two and a half hours. Nevertheless it is a matter of common experience that walking is suitable for low speeds, and is indeed, up to a certain limit, more suitable than running. But when higher speeds are required, the muscular mechanism of the body is adapted to run. There is a range of speeds at which, mechanically considered, running and walking are equally possible, a range which is fairly strictly limited since really fast walking demands a considerable course of training and a high degree of athletic efficiency. Within such limits it is possible to compare the energy expenditure required in the two methods of progression. F. G. Benedict and H. Murschhauser (1915),[1] Furusawa and others (1924),[2] basing their conclusions upon the oxygen intake during the effort, have demonstrated the greater energy efficiency of running. Recently Ogasawara,[3] working from the department of industrial physiology of the London School of Hygiene, has repeated these investigations in estimating the oxygen requirement—i.e., the excess of oxygen used in exercise and recovery—per minute when walking and running at the same speed.

Ogasawara's subject walked or ran 500 metres whilst carrying a portable Douglas bag in which the expired air was collected during the exercise and the subsequent period of 40 minutes rest. He found that when the rate of progression was substantially the same, the measured oxygen required for walking was approximately 4 per cent. greater at a speed of five miles per hour, increasing to 20 per cent. at six and two-thirds miles per hour. As Ogasawara points out, these comparisons of oxygen requirement per minute for walking and running are not a true comparison of the oxygen used or required per unit muscular movement—namely, per stride. In the case of running, fewer movements are performed than in walking, although the speed of progression and the total distance covered may be the same. Inasmuch as the length of stride in walking is less than that in running, more strides must be taken to approach the speed, and the difference in oxygen requirement appears to be directly related to the number of strides in each case. The vigorous arm swinging movements inherent in walking must be responsible for some increase in oxygen requirement, and attempts have been made to estimate its extent by independent observations. But as in fast walking the swing of the arms across the chest is an essential feature, the isolated study of this movement is without significance in the comparison of walking and running. In running, speed is an expression of length of stride and rapidity of striding, and both are amenable to considerable variation. Investigation of an Olympic games sprint champion showed that 45 strides are taken in the course of 100 yards at the rate of 270 strides per minute. In ordinary easy walking, at the rate of 3½ miles per hour, 110 strides each of a length of 38 inches were found to be taken per minute. The same trained walker when increasing his speed to seven, eight, and finally nine miles per hour found the length of stride to increase to 45 inches, which appears to be the maximum possible in a walker, any increase of speed being obtainable only by increasing the rate of striding, the maximum possible for a comparatively short time being 230 per minute, though rates of 200 to 212 to the minute could be maintained for a considerable period.

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[1] Jour. of Ment. Sci., January, 1934, p. 58.

[1] Carnegie Inst. of Washington, No. 231.

[2] Furusawa, K., Hill, A. V., Long, C. N. H., and Lupton, H.: Proc. Roy. Soc. B, xcvii., 168, 175.

[3] Ogasawara, M.: Jour. of Physiol., 1934, lxxxi., 255.

With the coöperation of G. P. Crowden and Adolphe Abrahams, Ogasawara has extended the range of his observations to a few similar investigations of running and walking 440 yards at the rate of nine miles an hour. This would appear to be the highest speed physically possible in the case of walking, and practically possible in the case of running, when the mechanical difficulty of carrying a Douglas bag is considered, not to mention the handicap of wearing a nose clip. At this speed the walking strides were at the rate of 200 per minute, the running at the rate of 175 per minute. The effort involved in the walk demanded 23½ per cent. more oxygen in exercise and recovery. Subjectively the exhaustion in walking is enormously greater, as might be expected from the effort required to maintain contraction of the muscles of the leg at this speed.

IMMUNISATION OF CATTLE AGAINST TUBERCULOSIS

From the Sir William Dunn School of Pathology, Oxford, comes a report by Prof. G. Dreyer, Dr. R. L. Vollum, and Dr. H. H. Ammitzböll on the results of a nine years' field experiment on the immunisation of cattle against tuberculosis.[1] The test was carried out at Söllestedgaard Manor, an estate on the Island of Lolland in Denmark on a herd of red Danish cows which was known to have been infected with tuberculosis since about 1885. By the time the experiment was commenced in 1924 the herd had been greatly reduced by the disease and all the milch cows and 75 per cent. of the bulls, heifers, and calves were infected. From November to May the cattle were kept stabled and in the summer tethered in the fields so that ample opportunity for infection existed. The defatted or "diaplyte," vaccine of dead tubercle bacilli, introduced by Dreyer in 1923, was used throughout. A preliminary course of four intravenous injections was given as soon as practicable after the birth of the calf with subsequent injections in autumn and spring. The first dose was 1·5 c.cm. of an emulsion containing 5 mg. bacillary substance per c.cm., increased to 10 c.cm. or more. Anaphylactic shock occasionally followed the third or fourth injection. Ninety per cent. of the animals in the herd were tuberculous at the beginning of the experiment, and although the immunised animals were allowed to mix freely with the infected stock, only two cases of clinical tuberculosis occurred among the 281 animals which had been immunised from an early age. Out of 55 animals examined post mortem, six had tuberculous lesions, in three instances the lesions being calcified. Taking these figures as a fair sample of the whole herd the records of the experiment indicate that only 10·9 per cent. of the vaccinated animals became infected. The writers consider that the procedure adopted in this experiment could be applied to any herd of cattle without undue inconvenience or interference with the commercial management of the herd.

THE TALE OF ST. THOMAS'S HOSPITAL

The period (1600–1800) in the history of St. Thomas's Hospital, covered by the second volume[1] of Prof. Parsons's record of its activities, is less picturesque than that described in the previous volume, but is still full of interest. Throughout this time the hospital continued on its previous site in Southwark, but now procedure had become more standardised. Since it was recognised as one of the great medical institutions in the country competition for election to the staff was already keen; candidates did not scruple to obtain letters of recommendation from King James I. or Charles I., and later from Oliver Cromwell, Fairfax, Speaker Lenthall, and others. In the year 1639 both the matron and the hospitaller were imprisoned for debt. Through the efforts of a committee of the governors the matron was liberated, but although the hospitaller was eventually able to return, the governors did not reinstate him. The trouble in both cases appears to have been due chiefly to the decrease in the purchasing power of money between 1620 and 1636, particularly in regard to food, and as the matron for most of this time was only allowed 2*s*. 4*d*. a week for that purpose it is small wonder that she became insolvent. The duties of the matron appear to have been onerous, and in 1642 they must have been increased by the following order made by the governors. "She is to examine all women patients suspected of being with child, monthly: and if she neglect to do so she is to provide for the child born in the hospitall." During the Civil war the sympathies of the governors appear to have been on the side of the Parliament. In August, 1643, the three surgeons of St. Thomas's asked for a gratuity for dressing many soldiers of the parliamentary army and were awarded £10 apiece. One of the surgeons however, Molins, went off to tend the Royalist wounded: he was captured when Arundel Castle was taken and displaced from the staff by order of parliament, but reinstated at the Restoration. The most distinguished physician to St. Thomas's at this time was Sir Francis Prujean, who was recommended by the great Harvey as the fittest president of the College of Physicians, when Harvey, although elected, excused himself from that honour on account of his age and infirmities. Prujean seems to have left nothing written whereby his medical capacity can be judged. In 1647 Dr. Thomas Wharton, the discoverer of Wharton's duct, was elected physician. He acquired a large practice in London; and it is pleasing to record that during the Great Plague of 1665 he remained at his post, Charles II. having specially asked him to take charge of the plague-stricken soldiers who were brought to St. Thomas's. It would appear that the only reward he got was an augmentation to his arms for which he had to pay a fee of £10 to the Heralds College. One of the surgeons to St. Thomas's who was also lithotomist to St. Bartholomew's successfully operated on Samuel Pepys for stone. The progress made between 1600 and 1700 is thus summarised by Prof. Parsons.

> "Typhus, enteric, and scarlatina were now recognised among the fevers, fresh air in sick rooms and wards was

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[1] Jour. Comp. Path. and Therap., March, 1934, p. 1.

[1] The History of St. Thomas's Hospital. By F. G. Parsons, D.Sc., F.R.C.S., F.S.A. Vol. II. London: Methuen and Co., Ltd. Pp. 281. 10*s*. 6*d*.

understood, steel was prescribed for chlorosis, and Peruvian bark for ague, while limbs were now amputated by the flap operation. Syphilis was treated by salivation, and lithotomy was a special branch of surgery. We must also note that leprosy, sweating sickness, and plague were things of the past."

Between 1693 and 1720 no less a sum than £37,769 was subscribed by the public and early in the eighteenth century much rebuilding was undertaken. During this century the staff included the great names of Mead and Cheselden. Sir Robert Clayton, whose statue by Grinling Gibbons is still in the possession of St. Thomas's, was one of the chief contributors, and Dr. Parsons remarks "that until the present history was undertaken nobody seems to have realised that such an important piece of Gibbons's work was owned by them." In 1707 the name of Thomas Guy, Esq., appears for the first time among the governors. It is interesting to learn that before 1655 all the governors were called Mister, after that the Esquires were carefully distinguished until in 1815 they all became Esquires. Guy was a great benefactor to St. Thomas's and defrayed the cost of a block of three wards costing £1100 and endowed them with £100 a year during his life. In 1721 he founded a hospital for incurables within the close of St. Thomas's. It is said that this scheme was suggested by Mead, with the idea that the new hospital should act as an infirmary to supply St. Thomas's with chronic cases to treat, and thus provide the staff there with interesting patients. Prof. Parsons, takes the view that Guy probably intended that the poor incurables should have a place where they could be cared for when the rules of the hospital required their discharge. As he points out, had Guy intended to found a new general hospital he would never have chosen a place so close to St. Thomas's. 'Guy wisely left a perfectly free hand to his executors and trustees to modify the hospital that he founded in the way that was afterwards effected. The manner in which the two hospitals later became separated belongs to the history of the next century and no doubt will find a place in the next volume.

VON GIERKE'S DISEASE

FIVE years ago E. von Gierke described a disturbance of carbohydrate metabolism characterised by great accumulation of glycogen in the liver and kidneys. He regarded the condition (which he observed in two children) as due to inability to mobilise glycogen owing to a deficiency of glycogenase. Since then a number of similar cases have been investigated during life, recent reports including those of van Creveld,[1] Unshelm,[2] Rauh and others. The most characteristic features appear to be great enlargement of the liver (which is uniform, smooth, non-tender, and unassociated with splenomegaly), ketonuria, and a low resting blood-sugar. The inability to mobilise glycogen readily is shown by a very slow or inadequate rise of blood-sugar after the injection of adrenaline, whilst the dextrose-tolerance curve is sometimes abnormal. As indicated by von Gierke's original cases, the retention of glycogen may affect organs other than the liver, and van Creveld has pointed out its importance in causing congenital hypertrophy of the heart and pylorus. The same author has studied in two cases the glycogen content of the blood by an original and simplified method, and has constantly obtained high values in the fasting state. He provisionally considers this elevation of blood glycogen to be of some significance in the diagnosis, and further regards the glycogen in the blood as being abnormal in that it was split with difficulty. Although the number of examples of this condition which have been recorded as v. Gierke's disease is still small, there is little doubt that it will prove commoner than is generally supposed. In this country isolated cases have been described by Bellingham Smith and O'Flynn,[3] and Worster-Drought,[4] and R. W. B. Ellis [5] has reported the condition in two sisters in whom it was associated with a marked degree of infantilism. He suggests that the infantilism—which is a not infrequent finding in the older cases—is due to consistent slight carbohydrate starvation of the tissues by reason of the low resting blood-sugar, and that it represents the reverse of the gigantism sometimes seen in the infants of women with early or "pre-diabetes" whose blood-sugar is slightly though consistently raised.

VITAMIN-A DEFICIENCY AND THE TEETH

THE rôle of vitamin A as an essential element in the diet for normal functioning of the nervous system was first established by Prof. E. Mellanby. Mrs. May Mellanby then showed that when this vitamin was deficient the epithelial and sub-epithelial gingival tissues in dogs became hyperplastic and readily infected. Taken in conjunction with Mrs. Mellanby's studies on the effect of vitamin-D deficiency on the teeth of experimental animals, this suggested that just as vitamin D might be the main factor in bringing about an immunity to dental caries, so vitamin A might be equally essential in preserving the integrity of the gingival tissues and so conferring immunity to pyorrhœa. Mrs. Mellanby in conjunction with J. D. King has now published a paper [6] describing a series of experiments on dogs, rats, and rabbits to illustrate the effect of a diet deficient in vitamin A on the nerve-supply of the teeth. The animals were given a basal diet adequate in regard to vitamin D and other constituents and to this was added vitamin A in such forms as cabbage, carotene, and cod-liver oil. Controls in each group received the same basal diet but with the substitution of heated alfalfa or heated olive oil for the vitamin A element. The duration of the experiments varied from 25 days up to six months in the different animals used. Immediately after the animals were killed pieces of the maxillary and mandibular nerves just peripheral to the Gasserian ganglion were taken and prepared by the Marchi and other methods. It was found that in all the animals given a diet rich in vitamin A the gums were normal, both clinically and microscopically, while sections of the nerves showed no signs of degeneration. Among the controls gingivitis was present in all three classes of animals. Microscopically the periodontal tissues showed hyperplasia of the gingival epithelium. Sections of the nerves revealed degeneration in varying degrees, while those of the Gasserian ganglion showed chromatolysis of Nissl's granules in many cells. The illustrations contrasting the appearance of the nerves in the two sets of animals are convincing. It would appear that two distinct lesions may result from a diet deficient in vitamin A; an infective lesion of the soft gingival tissues and a degeneration of the sensory nerves supplying them. That these two changes are connected seems probable since there is a good deal of evidence that the integrity of tissues depends on trophic influences. Attempts are now in progress to determine which of the changes comes first, for establishment of the fact that degeneration of the nerves always preceded the changes in the gingival tissues would support the idea of a causal relationship. The authors suggest that the lack of neurotrophic control induced by a deficiency of vitamin A may be partly responsible for the incidence of pyorrhœa and other gingival diseases. It would be unwise at this stage to emphasise too strongly the analogy between effects produced experimentally on animals and the diseases of the gums common among mankind. Clinical observation in many parts of the world has shown that pyorrhœa is prevalent among races showing a high immunity to caries, and this applies also to individuals. It is, of course, possible that a diet might be adequate in vitamin D and poor in vitamin A and vice versa, but their distribution in nature makes this unlikely. The apparent absence of any local factor in many cases of pyorrhœa, especially in young persons, suggests strongly that some general factor is primarily responsible for the incidence of the disease and thus lends some support to the view that nutrition may play a part in the ætiology of pyorrhœa. It would be interesting to test the hypothesis by experiments on man comparable to those undertaken by Mrs. Mellanby in Birmingham and Sheffield on vitamin-D deficiency and by Boyd and Drain in America. Such tests would be more difficult to plan in so far as the main incidence of dental caries is in early life and can be investigated in children living under institutional conditions; whereas the incidence of pyorrhœa is greatest in adult life where suitable conditions for large scale feeding experiments, in this country at least, are not easy to come by.

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[1] Creveld, S. van: Arch. Dis. Childhood, February, 1934, p. 9.
[2] Unshelm, E.: Deut. med. Woch., April 27th, 1934, p. 633.
[3] Smith, E. B., and O'Flynn, E.: THE LANCET, 1933, i., 297.
[4] Worster-Drought, C.: Brit. Med. Jour., 1933, i., 403.
[5] Ellis, R. W. B.: Proc. Roy. Soc. Med., May, 1934, p. 943.
[6] Brit. Dent. Jour., June 1st, p. 538.

"LIVING DANGEROUSLY"

To put medicine on the boards of the theatre is attended with fundamental difficulties similar to those which await the writer who uses medicine in the development of a novel. In each case medicine offers two invitations, one on the clinical side and the other on the administrative or professional side, and in both the opportunities for the layman to go wrong are numerous, for neither the Medical Acts nor therapeutic treatises are simple of comprehension or open to popular condensation. The author, dramatist, or novelist, when medicine is the theme, should not therefore be blamed for inaccurate presentation of details, which may fairly on occasion be subordinated to the necessities of the story. But that way danger lies; it is not easy for the layman to decide whether what is apparently a detail may not be a fundamental principle. However, in the medical play, "Living Dangerously," which is meeting with interested attention at the Strand Theatre, Mr. Reginald Simpson and Mr. Frank Gregory have been able to avoid all serious misrepresentation and also to furnish arguments for a medical reform which the public at any rate considers necessary. True, no medical firm of the constitution described could be found in Wimpole-street, and no procedure of the exact sort depicted could take place in Hallam-street; but the exigencies of the narrative have entailed the inaccuracies, while the balance of criticism is preserved, for, if the medical villain is a disgusting fellow, as played by Mr. Martin Walker, the brow-beating barrister, presented by Mr. Eric Stanley, would be a greater danger to wholesome society. The first two acts are taken up with the description of an unprofessional traffic in drugs, and a trial before the General Medical Council, which has its real origin in that traffic, but the issues involved are those of an accusation of adultery with a patient. In the third act we move from medical Marylebone to the wealthiest street in New York City, and the action becomes frankly melodramatic. The doctor who has been wrongfully removed from the British Register is described as having had no difficulty in taking the necessary degrees and in rising promptly to a high professional position in America. That we submit to be very unlikely, but the improbability should irritate no one because of the brisk happenings which follow, and which are concluded with a particularly neat application of rough justice. The essential message of an interesting play is that there should be some recognised form of appeal from the decisions of the General Medical Council, and Mr. Godfrey Tearle, in the character of the unjustly expelled doctor, gives by his admirable acting a force to the plea. But in real life the false testimony, neatly supplied by Miss Helen Goss, in the rôle of the perfect female dog, would not have had the force attributed to it; and Miss Carol Goodman, the pathetic victim of malignity, when giving her evidence would have been protected from gross insult.

A PIONEER OF AMBULANCE

Dr. Arthur William James, who lost his life on June 18th in a motoring accident, had done more than anyone living to mitigate the terror of accident on the road. It is just thirty years ago since Dr. James enrolled some 1100 medical men in London, about one in five of the total number, to form the Metropolitan Street Ambulance Association. Already at that time there were 15,000 severe casualties each year in London streets and there was no organisation or equipment for the rapid transport of injured persons to home or hospital. In that year pressure was brought upon the London County Council by the Presidents of the Royal Colleges and others to induce the Council to graft upon its fire brigade an efficient ambulance service. It was, it seems, Sir William Church who first saw the practical advantage of combining these two services; Dr. James, who was not only founder but hon. secretary of the Ambulance Association, was able effectively to point out the ease with which the fire brigade service could deal with casualties, if provided with the men, horses, and ambulances, without interfering with their primary duties. The desired change followed quickly upon the combined stimulus, and shortly after that date London took steps to redeem the reproach of being behind Liverpool and many continental towns in the provision of help for those unable to help themselves in case of sudden illness or accident. In this achievement the name of Arthur James will be gratefully remembered.

A RECEPTION will be held at the Royal College of Surgeons of England, Lincoln's Inn-fields, on Wednesday, July 11th. A series of interesting demonstrations will be provided by prominent institutions and medical schools directed to the illustration of recent advances in medical science, special attention being given to experimental researches bearing on the nature and treatment of cancer.

ON Wednesday, June 27th, at 5 P.M., at the house of the Royal Society of Medicine, 1, Wimpole-street, London, W., Dr. William Allen Pusey, of Chicago, will deliver the Prosser White oration to the St. John's Hospital Dermatological Society. The subject of the lecture will be Disease, Gadfly of the Mind, especially the Stimulus of Disease in the Development of the Mind. The meeting is open to all medical practitioners.

PROGNOSIS

A Series of Signed Articles contributed by invitation

VII.—PROGNOSIS OF STAPHYLOCOCCAL INFECTIONS OF THE SKIN

THE structure of the skin renders it highly resistant to both physical agents and bacteria, but like most suits of armour it has its weakness; in this instance it is the depression known as the hair follicle. As the staphylococcus finds this site most suitable for multiplication it is not surprising that this organism is responsible for a considerable proportion of the infections of the skin. It may be assumed that most people are frequently contaminated by the organism. Yet mere contact is not necessarily followed by a pathological lesion—the staphylococcus may enter a follicle and remain alive for days, but unless there is added trauma to the skin and the resistance is consequently lowered, the cocci are unable to multiply and do harm. The experiments of Norton and Novg[1] appear to show that the skin has no direct germicidal power. These workers applied *B. prodigiosus* to the skin and found that the organisms diminished rapidly in numbers, particularly during the first ten minutes. Similar results were obtained when cultures of this organism were placed on inert material such as paper or leather. The same authors made the interesting observation that the rate of disappearance in each instance appeared to be governed almost directly by the amount of moisture present, and clinical experience with staphylococcal infections appears to support these findings, for drying the skin is undoubtedly one of the most efficient methods of preventing the spread of the lesions.

It is noteworthy that some persons carry foci of staphylococcal infections on the skin without intermission for 20 or more years, and yet contacts living in intimate relationship with them may remain absolutely free.

A fact not generally appreciated is the relative immunity of the female. An analysis of 163 cases of recurrent boils attending the skin department of the Royal Infirmary, Sheffield, showed that of this number only 18 per cent. were female. Even in deeper infections such as osteomyelitis, the incidence is approximately three males to one female. It is questionable whether the difference in environment and exposure to injury of the sexes can be entirely responsible for this variance. It appears as if the female skin offers a less suitable habitat for the growth of the bacteria.

It has already been stated that the staphylococci find the follicle the locus minoris resistentiæ. If the resistance of the individual is high, the activity of the organism may be restricted to the mouth of the follicle producing the condition known as

SUPERFICIAL PUSTULAR FOLLICULITIS

an example of which condition is found in the minute pustules found on the skin around infected wounds and boils. Similar pustules are also met with frequently on the anterior surface of the thighs in workers engaged in industries involving the use of oil or tar. Another situation is on the scalp of children, usually as a sequence to an infection of pediculosis capitis or impetigo.

On the glabrous skin the pustules run a benign course, and even without treatment there is a tendency for them to dry up and for the tiny crust to be shed. Occasionally a few of the pustules may coalesce, forming small superficial ulcers; in this event the frequent application of wet dressings of ½ per cent. silver nitrate solution will usually promote rapid healing. When the affection involves the thicker hair of the scalp or pubis the prognosis is by no means so favourable, for successive reinfection of the follicles is apt to occur, accompanied by swelling of the neighbouring lymphatic glands. The complaint may continue for weeks or even months, unless suitable treatment is carried out with careful attention to details. The hair should be clipped short, crusts removed, pustules opened, and the area painted with applications such as 1 per cent. solution of brilliant green, or 2 per cent. sol. silver nitrate. Should X ray therapy be available it will be found to expedite healing.

THE BOIL OR FURUNCLE

If the conditions are favourable the staphylococci, in addition to multiplying at the orifice, gain access to the depth of the follicle along the hair shaft and produce the boil, the lesion so frequently met with in youth. The prognosis of the single boil is excellent, the average course being about two weeks, but during that brief period the sufferer usually unwittingly promotes the growth of staphylococci in the neighbouring follicles by the warmth and moisture of applied poultices and fomentations. Other boils follow, and soon follicles near and far are contaminated with the same organisms which only wait favourable conditions for their growth. If looked for, contributory causes will be found in the skin in a large proportion of the cases—for example, scabies, seborrhœa, and lastly, but important, pruritus ani. The trauma from any one of these complaints may suffice to lower the resistance of the skin and may prolong the malady of recurrent boils indefinitely unless removed, or until the patient by a process of continued self-inoculation establishes sufficient resistance to protect himself against the staphylococcus.

In addition, the possibility of general predisposing causes must be considered; for instance, debility following serious systemic disorder will naturally influence the course of the malady. The relationship between recurrent boils and diabetes has received considerable attention. In actual practice the percentage of cases of recurrent boils associated with glycosuria is very small. Fortunately sufferers from furunculosis are usually unaware of the serious complications which may assail them during the course of their complaint, but the association between the infections of the skin and the conveyance by the blood stream to the deeper areas is now generally recognised, and surgeons repeatedly obtain a history of boils preceding such diseases as perirenal abscess, prostatic abscess, and osteomyelitis. The most dramatic and serious complication, however, is the extension of the infection from the boil on the face and neck to the cerebral veins, a disaster nearly always terminating fatally. Therefore the presence of a boil on the face, particularly in the neighbourhood of the upper lip, is a contingency which necessitates a guarded prognosis, but it should not be unduly pessimistic. Happily, [illegible] the face, most boils run a simple course, in fact heal rapidly; nevertheless it is a wise precaution to detain the patient in bed until the core has been discharged.

The tendency for a boil to be followed by a succession of others at short intervals is so constant that the prognosis of the malady largely turns on the efficiency of the prophylactic measures. The patient naturally seeks relief from the pain and admittedly there is nothing so efficacious for the purpose as moist heat in the form of a poultice or fomentation. Nevertheless, it cannot be too strongly emphasised that it is also a common cause of the recurrence—the purulent discharge soaks into the dressings and cocci are spread to the neighbouring follicles where they are encouraged to multiply under the optimum conditions of heat and moisture. Pads soaked in methylated spirit or a mixture of sulphate of magnesia and glycerin will be found a useful substitute for fomentations.

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[1] Norton and Novg: Amer. Jour. Pub. Health, 1931, xxi., 117.

Attempts have been made to abort boils in their early stages before the infection travels down the follicles, but in my experience these seldom succeed. Although a number of persons appear to have a low resistance against the *Staphylococcus aureus*, it can be stated definitely that in the majority of instances the prognosis is largely governed by the treatment adopted. Contributory causes, either general or local, should be sought for and, when possible, removed, and every effort should be made to prevent spread from the initial lesion. Innumerable therapeutic remedies have been extolled and mostly, I fear, abandoned. It is impossible to discuss even the most popular, but many years of critical trial justifies me in advocating intramuscular injection of colloidal manganese as a means towards cutting short this painful malady.

Strictly speaking, the pathology of the axillary abscess differs from that of the boil—the primary infection being through the sweat ducts; but the ætiology and course is similar, except that the axillary abscess is quite often absorbed without discharging externally.

THE CARBUNCLE

Although a follicular infection with the *Staphylococcus aureus* is the initial lesion of both the boil and carbuncle, in the latter either the terrain is more favourable or the virulence of the organism is greater. The toxin from the rapidly multiplying cocci produces a necrosis which extends and involves the neighbouring follicles. A carbuncle must be considered a more serious lesion than a boil; the duration ranging from four to six weeks. It is accompanied by more pain, often rigors and malaise. In the young or middle-aged the outlook is favourable, excepting the fact that as in boils, other follicular infections may follow; but in debilitated old people the tissue necrosis may assume vast proportions and the absorption may cause delirium, exhaustion, and sometimes death. In favourable sites, when the necrosis is not too extensive, total excision may be practised with advantage, in order to reduce the length of the healing time, and also as a measure to avoid the contamination of the follicles.

SYCOSIS

The term is usually applied to a follicular eruption of the beard and moustache, but similar lesions of the follicles may be found in other areas where hair is present. The chronicity is due to a succession of small abscesses which discharge into the follicle. The epidermis appears to be unable to establish an immunity against the staphylococcus; thus healing of the small abscess cavity is incomplete and a focus remains. Blepharitis, a [illegible] r infection of the lid margin, often [illegible]recedes t[illegible] of the beard, [illegible] by the tears for the cocc[illegible] [illegible] to t[illegible] The chroni- [illegible] to the nose, [illegible] is [illegible] when once [illegible] of th[illegible] [illegible] [illegible], and [illegible]lished [illegible]

the disease may persist for an indefinite number of years. It may be confined to the beard for a long period, and then the hairy regions, such as the eyebrows, scalp, axillæ, and pubis, may be invaded. In spite of the fact that the rest of the skin must be heavily infected with the same cocci, it is noteworthy that boils and other deep lesions are absent. Although there is no tendency to spontaneous recovery a satisfactory termination may usually be anticipated providing the infection is in a relatively early stage and the patient gives his whole-hearted coöperation in the treatment. As the complaint is most commonly met with in the industrial population, it is likely that adequate and carefully selected diet, combined with good hygienic conditions, would be of help. As a local application there is no remedy more efficacious than the following paint: brilliant green, 1 per cent.; methylated spirit and distilled water, equal parts; particularly when combined with suitable X ray therapy.

RUPERT HALLAM, M.D.,
Lecturer on Diseases of the Skin, the University of Sheffield.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

Surg. Lt. J. C. Gent to be Surg. Lt.-Comdr.

The following appointments are notified:—

Surg. Lt.-Comdr. G. D. J. Ball to *Pembroke*, for Chatham Barracks.

Surg. Lts. W. B. Taylor to *Grimsby*, and H. A. Clarke and H. E. B. Curjel to *President*, for Medical Dept., Admiralty.

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Lts. to be Surg. Lt.-Comdrs.: A. L. Gunn and R. H. Enoch.

ROYAL ARMY MEDICAL CORPS

Lt. G. L. McLeod to be Capt.

TERRITORIAL ARMY

Capt. T. L. Clark to be Maj.

Lt. J. D. A. Gray, from Gen. List, T.A., to be Lt.

Lts. N. Moulson and H. G. Wimbush to be Capts.

W. P. Purvis (late Offr. Cadet, Blundell's Sch. Contgt., Jun. Div., O.T.C.), T. N. Rudd, and T. McK. Robb (late Offr. Cadet, Taunton Sch. Contgt., Jun. Div., O.T.C.) to be Lts.

Supernumerary for service with O.T.C.: Capt. J. Whillis (Empld. Durham Univ. Contgt., Sen. Div., O.T.C.) to be Maj.

TERRITORIAL ARMY RESERVE OF OFFICERS

W. N. Lycett to be Lt.

SHORT SERVICE COMMISSIONS IN THE R.A.M.C.

The following candidates who presented themselves for short service commissions, have been granted commissions as lieutenants on probation in the Royal Army Medical Corps: W. M. E. Anderson, M.B., B.Ch., and H. B. Wright, M.B., B.Ch., Trin. Col., Dublin; J. Boyle, L.R.C.P., St. Mary's Hospital; R. H. Foster, B.Ch. Camb., Univ. Col. Hospital; J. S. Ruddell, M.B., B.Ch., Trin. Col., Dublin; A. G. D. Whyte, M.B., B.Ch., Aberd. Univ.; A. L. Pennefather, M.B., B.Ch. and C. G. O'Driscoll, M.B., B.Ch., Trin. Col., Dublin; D. T. Swift, M.B., Ch.B., Otago Univ.; F. E. Buckland, M.R.C.S., Oxford Univ.; A. MacLennan, M.B., Ch.B., Aberd. Univ.; J. H. J. Crosse, M.R.C.S., St. Bartholomew's Hospital; J. Morgan, M.B., Ch.B., Liverp. Univ.; R. A. Stephen, M.D., Aberd. Univ.; E. H. P. Lassen, M.R.C.S., King's College Hospital; R. S. Vine, M.R.C.S., Guy's Hospital; I. Buchanan, M.B., Ch.B., Edin. Univ.; J. E. Jameson, M.R.C.S., St. Thomas's Hospital; M. W. Allen, M.R.C.S., Middlesex Hospital; W. T. Bermingham, M.B., B.Ch., Trin. Col., Dublin; K. H. Clark, M.B., B.Ch., St. Mary's Hospital; M. J. Horgan, M.B., B.Ch. Trin. Col., Dublin. Seven of these officers have been seconded for the purpose of completing appointments in civil hospitals.

SPECIAL ARTICLES

VOLUNTARY HOSPITALS CONFERENCE

(Concluded from p. 1311)

Out-patient Departments

Sir ROBERT BOLAM, opening the discussion following Lord Onslow's paper on out-patient departments, which we summarised last week, said that delay and waiting were not confined to the work of doctors and dentists. He thought a short and popular account of the work of Lord Onslow's committee would be of great educational value. The out-patient departments, generally speaking, were so overcrowded that specialists working therein were not used to the best advantage, patients had to wait, and coördination between general practitioner and specialist services was not properly developed. The only remedy was educational propaganda. Much might be borrowed from the experience of the world of commerce. Some time and much exasperation might be saved by consideration of architectural features and the use of directional signs. Was it too much to hope that anxious patients might meet a courteous usher, with sufficient messengers to serve as guides? The day was over for the slogans "Ever-open door." "No one turned away"; they caused the mistaken impression that the hospital was available for all kinds of service. The time had come to teach the people what services were available in hospitals and how they differed from the services obtained from the general practitioner. It was uneconomical to use the consultant as a sifting agent; that was the work of the general practitioner. There ought not to be any patients who found difficulty in getting a doctor's letter; the percentage of doctors who resented referring a patient to a hospital was negligible. The public must educate the doctors to give letters to hospitals without difficulty. Patience and forbearance on all sides were necessary. The problem could not be dealt with solely by conferences and reports; the essential conservatism of the people must be remembered. The hospital-going habits of the nation would not be changed in five minutes.

Mr. ST. JOHN WOOD (Northampton) and Dr. E. BARNES (Manchester) described successful appointments systems in their hospitals, which had overcome all the difficulties mentioned. Secretarial assistance was provided but dictaphones had not proved satisfactory.

Mr. A. H. LEANEY (Birmingham) emphasised that the out-patient was more important than the in-patient department because it dealt with the early stages of disease. It must not be rushed. Mr. F. CHORLEY (Devon) lamented the belief of many patients that the earlier they arrived the faster they would be cured.

Sir HENRY BRACKENBURY observed that some hospitals had already converted their out-patient departments to purely consultative work. One of the great evils of the past was the divorce between hospital and private practitioner work. The young resident medical officer somehow got it into his head that the doctor practising outside was not worth considering. It was of the utmost importance that the man doing the domiciliary work should be regarded as an integral and important part of the patient's treatment, both before and after hospitalisation. The discharged patient should be referred to a doctor—and not primarily to the district nurse.

At the discussion on the

Function of the Cottage Hospital

Lord HORDER, from the chair, mentioned the difficulty of defining this important unit of the voluntary system. The cottage hospital gave undoubted benefits to the patient, the doctor, and the community. It was an excellent institution for first-aid—medical as well as surgical. The proximity of friends was a very desirable and important factor in the care of the sick, and the quiet and fresh air of the cottage hospital were of great therapeutic value. Nevertheless the subject urgently needed discussion. Some well-equipped cottage hospitals were empty; others were overcrowded.

Mr. W. M. GOODENOUGH (hon. treasurer, Radcliffe Infirmary, Oxford) in the opening paper expressed appreciation of the work done by cottage hospitals, and recognised the great variation in local conditions. He regarded these hospitals as units in a hospital area, by which he meant one served by a general hospital having a number of cottage hospitals connected with it. Coördination was of increasing importance. He defined a cottage hospital as one in which specialists were not regularly and easily available; there were no resident medical officers or highly specialised equipment, and the staff consisted of local general practitioners. Cottage hospitals were beginning to deal with a certain amount of major work; this was an undesirable development, because every case might produce complications demanding the immediate attendance of a specialist, a resident doctor, or specialised equipment; and transport at this stage could not be good for the patient. Many cottage hospitals now had more beds than they could use and often exercised too little economy. The over-development of cottage hospitals had diverted funds from the key hospitals. The cottage hospital should be limited to the kind of case that could be adequately dealt with by a skilled nurse with the occasional assistance of the local practitioner, and the average cost should not exceed two guineas per week per patient. Another important function of the cottage hospital was to provide convalescent accommodation in the country, provided there was a separate ward for acutely ill patients. As residential centres for district nurses, cottage hospitals might in future prove very valuable. District nurses at present worked as isolated groups under very difficult and varying conditions. In a hospital they could be housed comfortably and economically; motor transport could be provided for them; their more serious cases could be removed to the hospital, and their standard of work would be more uniform than it was at present. The idea should, however, be approached with a good deal of caution. One of the most valuable features of the district nurse was her close and intimate contact with the village people, with whom she lived as one of themselves. Many valuable nurses would object to residence in a nurses' home.

The cottage hospital was essential to the general practitioner, and its connexion with his work was intimate and obvious. The qualities upon which the cottage hospital system had been built were those of local loyalties and enthusiasm, and these qualities must be fostered in every possible way. Coördination might be achieved by the establishment of advisory committees representative of all the hospitals in a district; these organisations would not over-ride local views or local independence but would make recommendations for the allocation of funds and space.

The cottage hospital was obviously not suitable for the training of nurses, and to staff the cottage hospital with trained nurses only would cost more than most of them were now spending on their nursing staff. A suggestion worthy of consideration was that they might combine with central hospitals for interchange of staff—the trained nurses gaining experience of housekeeping and other work in a cottage hospital, and girls too young for general hospital training being kept for a period at the cottage hospital.

Dr. C. E. S. Flemming suggested the name "district hospitals" for these institutions. They were essential for the completion of the hospital service of the country, and to enable the general practitioner to give of his best, which was now of a very high order. It might be dangerous to interfere with the development of such a growing department by rigid rules. They were essentially general practitioner hospitals, and ought to remain so. Coöperation with larger hospitals should include both work and maintenance; each district must provide its own funds, but charges should be standardised.

Mr. G. H. J. Dutton (Skegness) pointed out the usefulness of regional committees in motor accident cases. Mr. P. J. Neate (Cancer Hospital, Fulham) urged closer collaboration between great general and specialist hospitals and the cottage hospital for the purpose of ensuring early and accurate diagnosis. Mr. A. Fouchard (Mexborough) disagreed with the reader of the paper. His cottage hospital had much up-to-date equipment, two resident medical officers, and a nurses' hostel, supplied largely by miners' welfare funds. He did not think convalescents or district nurses should be accommodated in the cottage hospital. Mr. Goodenough's suggestions would not be welcome in South Yorkshire. He urged that local executives should be left to deal with local needs as they saw them. Mr. Chorley quoted figures to show that there were many vacant beds for convalescents, but unfortunately cottage hospitals did not care to take back cases that had been sent on to key hospitals. Mr. Goodenough replied to a question: do most cottage hospitals treat members of their contributory schemes as subscribers and give them a voice in management? He said that he thought they usually did, by means of elected representatives. Mr. J. A. Ritchie (Hornsey) recommended allowing every doctor in the district to use the hospital, and providing for visiting specialists the same efficiency and equipment that they found in their own hospitals.

Lord Armstrong (Newcastle) said that in Northumberland some patients preferred district nurses, who lived in their own houses, and others preferred village nurses, who lived in a community. The problem of motor accidents greatly concerned cottage hospitals.

A paper on

The Hospital and its Architect

was read by Mr. E. Stanley Hall, F.R.I.B.A. He said that two points were of vital concern in the economy of hospital planning: the architect should be called in at the earliest possible moment and he should have a very small and very sympathetic building committee. The architect was seldom called in until the site had been selected, yet many points of contour, subsoil drainage, sewage disposal, approaches, water and other supplies, aspect and prospect would affect both planning and cost. The best way of coördinating the various interests was to have a technical committee of physicians and surgeons to report to a very small lay committee directly responsible to the board. The technical committee would decide what they wanted, after frequent consultation with the architect, and the lay committee would decide what could be afforded. It was difficult to make lay members understand how vitally important was the work of planning in the early stages. The growth of hospitals had been largely haphazard. The programme to be settled included the total number of beds and their allocation, the nursing unit, the operating theatre unit, the casualty and out-patient department, the staff home, administration block, boiler house, laundries, and pathological department.

Subject to statistical requirements, the hospital should be as large as possible, because expensive plant such as X ray, electrical, and sterilising apparatus need not cost twice as much for twice the number of beds. There should always be allowance for future expansion. It was more economical to have one large hospital than two small ones. The architect must know the number of patients per nursing unit before he could plan the wards. The present tendency was to decrease the size of the wards, but this increased the cost of nursing, and hospital authorities had to hold the balance. The necessary ancillary rooms for each unit must also be decided on at an early stage. Some hospitals preferred to have separate theatres on different floors; this was less economical than grouping the theatres into one unit. Twin theatres could often share a sterilising plant, thus effecting an important economy. Considerable ingenuity was required in arranging for students in the theatres of teaching hospitals. A valuable but expensive device was the French Scialiscope, which threw a reflection of the operation upon a screen in an adjoining room. Any previous experience the architect might have of casualty and out-patient departments would only be enough to warn him of the necessity for obtaining the most detailed information of the way in which the one in question was to be worked. There was infinite divergence in practice. An architect could not fail to be struck by the uneconomical occupation of out-patient consulting-rooms and theatres. He would plan a most elaborate suite for eye cases and be told that it would be in use once or perhaps twice a week. The needs of various specialists must be weighed very carefully in planning the out-patient department.

The architect would know that every nurse and maid should have a separate bedroom, generally with fixed basins and fitted wardrobes—requirements which increased the capital costs but saved running expense. Staff dining rooms and kitchens had an important bearing on the whole design. The kind of fuel to be used and the kind of heating apparatus required must be decided early. The advent of the Grid had brought electric energy within the reach of most sites, but gas had many attractions if the price was right and quality and pressure guaranteed. Laundries should be moved away from the hospital if possible, and a common laundry for all the hospitals of one area would be an economy and an advantage.

The first problem for the architect when he had collected the rough parts of this jig-saw puzzle was to consider whether the hospital was to extend horizontally or vertically. Separate units of two or more storeys minimised the risk of fire, and were more elastic in plan and less institutional in appearance. High buildings demanded lifts, which were expensive to run and maintain; the upper floors were healthiest and should be used for theatres and as many patients as possible, and not for kitchens and dining rooms. Flat roofs should always be available for staff if not for patients. Balconies were preferable for the patients. Finally the architect had to consider the circulation of nurses and staff and the contacts between different departments and between the departments and the outside world. Not until all these considerations had sunk in should he begin to plan his building. Hospital planning was a matter of coöperation and sympathy between all parties, and the more they got together in the earlier stages the greater the chances of getting a hospital that was medically perfect, economical to run, and architecturally satisfying.

Mr. E. ROCK CARLING described a recent visit to a new nurses' home of admirable architectural proportions in which nurses on the top floor could not see out of their windows! No profession suffered more from vexatious amateur interference than the doctor's; he understood therefore that architects might well object to it. Nevertheless many reforms in medicine were due to pressure from outside. The architect's method of remuneration was a grievance in that it did not encourage the architect to minimise the final contract price. New methods involved arduous calculations and much anxiety, and finally left the architect with a smaller fee. The less competent the architect the more the employer had to pay. An attempt to change this old custom would carry most of the architects with it. The building of an entirely new hospital should involve reconsideration of all the customs and work of the institution. One member of the staff should follow the patient from his first appearance to his discharge, and members of the staff must attend every day. The potentialities of the almoner's department must be appreciated, and a really competent almoner put at its head. In such a department business methods and records were found, and it should lie between incoming and outgoing patients. There must be complete circulation of the patient, with minor subcirculations. Apparently undue corridor space was demanded, but was well worth while. No offer by a generous donor should allow any one department to exceed its proper proportions, which should be settled on fundamental principles, for this upset the whole working of the hospital's maintenance. No special department should be provided in a general hospital if there were a neighbouring specialist hospital offering that service. To do effectual work in specialist departments there must be special apparatus which could not be used by other departments; they must be empty part of the time, but power, heat, and light might be cut off from them during the unused periods. Architects, he supposed, looked on medical men as rather like the traditional Irishman who never knew what he wanted and was never happy till he got it, but it was not wholly the fault of the medical man; as soon as he got a plan on to paper his neighbours at once started suggesting alterations.

Dr. RENÉ SAND, technical counsellor of the League of Red Cross Societies, and former president of the International Hospital Association, spoke on

Hospital Administration on the Continent

On the continent, he said, the voluntary hospital was not in the foreground. The matron, when she existed, had not the same authority, and the historical background was different. France and Belgium were typical of countries in which the hospitals belonged mainly to the local public assistance authorities. The result was that on one side the board of hospitals was constantly warned by the municipal authorities that they must economise, while on the other side public opinion cried out for better institutions and equipment. Half-measures were the rule. Some Paris hospitals were at times so crowded that an 18-bed ward housed 30 patients. Hospital technique was hardly recognised as such, and the members of hospital boards were well-meaning citizens who judged things by "horse sense." No general plan had been put into force and there were still many antiquated, dilapidated small institutions. Even in the bigger hospitals few nurses had received a regular training, the science of dietetics was unknown, and accounting was a list of receipts and expenditure. Nevertheless, great improvements had taken place, and hospital technique was forging its way. Italy and Spain were both making great strides with their hospital work.

Germany and the Scandinavian countries represented a second European group in which hospital administration was partly separated from the public authorities. Austria had in 1920 passed a law establishing a hospital plan for the whole country. In Scandinavia the planning, maintenance, and administration of hospitals had for centuries been the function of the State, and the running and equipment was on lines parallel with those in this country. In Turkey the law provided that every province should have its hospital, and a school for the training of Moslem priests had been found to fit admirably the purpose of a child welfare centre. In every direction there was progress and grounds for optimism.

A paper on

Coöperation between Voluntary and Municipal Authorities

was read by Sir GEORGE NEWMAN. He submitted a table showing the actual position of the four classes of hospital—monastic, educational, charitable, and municipal—at the present time, and pointed out that the convenient division into municipal and voluntary institutions was less definite than formerly because voluntary hospitals were more and more engaged in municipal service, while municipal hospitals were adopting voluntary principles. There was no reasonable cause of war between them; there was cause only of marshalling them together in a joint war against disease. The problem was constituted by the fact that the municipal hospitals were maintained on a basis of rates and taxes, and as they expanded there might seem to be less need for the hospital supported by voluntary contributions. Nevertheless, it was far better to combine the two into one coöperative system than to allow the voluntary hospital to disappear. Great as were the services of the voluntary hospital system to the country, it had not met and could not meet the ever-widening and importunate medical needs of the population. The voluntary hospital stood for individual enterprise and self-denial; the municipal hospital for the formulated will of a free people. Clearly, one single health authority must serve the whole hospital needs of its area and the Local Government Act of 1929 sought to ensure coöperation between all the institutions in a district. More had been done by the authorities in support of voluntary hospitals than some people seemed to assume. No less than 300 local education authorities had paid very substantial sums to over 600 voluntary hospitals, for example, and the London County Council paid a yearly grant of some £25,000. Moreover, there had been much interchange of function, yet coöperation could not take place until the voluntary hospitals had established a representative committee prepared to act. This must be done by the hospitals themselves. It was obvious that the greater the goodwill and desire for coöperation the more fruitful would be mutual consultation. Nothing was so conducive to the dissipation of apprehension as a frank discussion of the situation. The survey reports of the medical officers of the Ministry of Health showed that the desire for common-sense coöperation was widespread, but there had been some indication of a fear on the part of voluntary hospitals. As a matter of fact, different authorities could not afford to engage in wasteful competition.

Lord COZENS-HARDY (chairman, Merseyside Hospitals Council) feared that the voluntary hospitals were being slow to realise the immense changes which must follow the Act of 1929. Already the local authorities had the majority of the total number of beds in the country. Nothing effective would be done if coöperation was confined to Section 13. There must be some joint committee, meeting regularly. Suspicion and prejudice were impossible foundations for coöperation, and such a committee might quite unconsciously do great educational work. It would also prevent any political action tending to antagonise the two systems.

Mr. L. G. BROCK (president, Board of Control) gave practical illustrations of coöperation in the field of mental hygiene: out-patient clinics at general hospitals, and the treatment of mental patients by specialists of all branches. Committees had been advised to put physicians and surgeons on the staff of the mental hospital while the psychiatrist was put on the staff of the general hospital.

Dr. FLEMMING said that some people had looked on municipal hospitals as a disease to be avoided and not as what they in fact were—allies in the fight against disease. A volunteer was no good unless he was a member of an organised army. The municipal hospitals were the complement of the voluntary hospitals and not in competition with them. His only fear of the municipal hospital was that the men working it might be overcome by the dead weight of officialism.

Mr. S. HUTTON (Glos.) mentioned certain difficulties of rural areas: poverty, staffing, and communication. He described the methods of coördination already established in his district. He recommended that the chairman of the voluntary hospital should be elected to the local authority. Mr. J. HENDERSON (Sheffield) and Mr. FOUCHARD related the coördinating work in their towns.

Hospitals Conference Banquet

The DUKE OF YORK presided at the banquet held in the Guildhall on June 14th. Replying to the loyal toasts he said that the great voluntary hospital systems of the country represented 1051 hospitals and 83,051 beds, and was a national asset of which everyone was very proud. Year by year, despite anxieties, it was expanding and declaring anew the determination of the people to extend help to the sick and suffering; some 2000 beds were added annually, as well as new appliances and equipment. The way in which the public contributed to the hospitals was wonderful.

His Royal Highness also proposed the toast the Voluntary Hospitals of Great Britain and Ireland, to which Lord STANMORE replied, confessing that even in the blackest financial periods the hospitals found their needs met. It was almost unknown for an institution to close down for lack of funds. The voluntary hospitals possessed the confidence of the people. The system was elastic, and as each new need arose some method of meeting it was found. He was confident that research work flourished more in a voluntary than in a compulsory atmosphere. Major R. JACKSON, also in reply to this toast, spoke in appreciation of the great interest taken in hospitals by members of the Royal Family, and of the valuable work done by officers of the conference.

Lord MACMILLAN proposed the Lord Mayor and Corporation of the City of London, saying that it was the ambition of every cause in the country to have a banquet at Guildhall. The essence of a voluntary movement was that it was independent and retained that sense of freedom and liberty that was our greatest heritage. Often in history the Lord Mayor and citizens of London had turned the scale in favour of liberty. No worthy object ever came to Guildhall and asked for sympathy and support in vain. The Lord Mayor replied, sketching the work of the Port of London sanitary authority in the Thames.

The health of the guests was proposed by Sir HAROLD PINK, who declared that nothing bound nations together better than hospital work; in its pursuit all animosities were forgotten.

Lord HORDER replied, saying that the guests had two common interests: gratitude for the hospitality accorded them and concern for the problems of hospital administration. Many of the guests had worked for years in the service of the voluntary system. The British ideal of the voluntary system was being watched very closely, and some were not too happy about it. The question of coöperation with municipal hospitals was vital and precarious. There seemed to be no sense of permanence in some of the methods of grouping voluntary hospitals. The voluntary system must go on, but it might be modified and adapted to changes in municipal and public life.

THE COMMITTEE AGAINST MALNUTRITION

THE first public meeting of this committee was held on June 13th at 34, Red Lion-square. Sir Gowland Hopkins, P.R.S., was in the chair. The gathering was so large that an overflow meeting had to be arranged, which was addressed in its turn by the speakers.

Sir GOWLAND HOPKINS said that he would have been glad to be present in any capacity, so great was his sympathy with the meeting. The outstanding social duty of the moment was to see that all classes of the people were properly nourished. It was even more important than to see them properly housed. To be poorly housed and well fed was preferable to being poorly fed and well housed. Any sound housing policy must go hand in hand with a sound feeding policy. There was no doubt that an increase in rent, which was often demanded by better housing, meant a decrease in food, and this, in present circumstances, was calamitous. The abundance in the world was common knowledge. Science and enterprise had reproduced the miracle of the loaves and fishes. But they were not being fed to the multitudes. It was important to remember that the multitudes needed fishes as well as loaves. Man could not literally live by bread alone, nor even by bread plus cheap sugar and margarine. Quality was important as well as quantity. The aims of the committee were non-political. They were to give the widest publicity to facts, which could then be used by whoever wished to initiate political demands and campaigns. The necessity for quick action should be kept to the front if the physical descent of the nation was to be arrested.

The inhibitions to proper progress were apathy and disbelief in a few, ignorance in many. A nation which knew that malnutrition existed was a sinful nation.

WOMEN AND CHILDREN

Dr. **Stella Churchill** spoke of malnutrition as it affected women and children. The condition of the pre-school child, she said, was most serious. In any case it was useless to give free education if we did not first give free food. In an examination of pre-school children made at Bermondsey, Dr. Churchill had found that 70 per cent. of babies of one month were over weight, whereas only 30 per cent. of one year were over weight. As soon as they were weaned the children began to deteriorate, and the deterioration continued until they reached school age. Leaving out nursery schools, which at present only touched a minute fraction of the population, there was no State supervision or nourishment for children between the ages of two and five. These children entered school as delicate, "chesty," ricketty subjects, ripe to take all forms of infection. The "chesty" child became later on the tuberculous child, the ricketty girl of five became, through malformation of the pelvis, a factor in maternal mortality. We were sated with sentimental appeals, Dr. Churchill said, to help sick children in hospital. If we fed the children properly, they would never get there. All surgical tuberculosis, for instance, could be prevented by proper feeding. Turning to the women, Dr. Churchill said that the mother of the family was the last to be fed. Women did not die of starvation every day, but they existed in a state of semi-starvation. By the time these women came to labour they were totally unfitted to bear the strain of it. They had difficult confinements, slow recoveries; sometimes they died and left their children worse off than ever. The present was a time of national emergency. We heard much at the moment about the drought, but little about the famine. But it was famine when the allowance for a child was two shillings a week. In some places in the country water was being taken round in carts. Food needed to be taken round in carts. There should be a floating kitchen visiting the people's homes, where they could get a dinner in exchange for a voucher. Lack of money could not be urged against proposals for feeding the people. The Road Fund had better be a food fund and national money put aside for a sinking fund had far better be sunk in the starving stomachs of children.

LEGAL AND ADMINISTRATIVE ASPECTS

Dr. **R. A. Lyster** said that he had been asked to deal with the legal and administrative aspect of the subject. This was important, for it was often possible to start a wave of enthusiasm, which in its turn provoked an official announcement, and the official announcement had power to make the enthusiasm wilt away. For example, the B.B.C. had lately broadcasted talks from the unemployed. These had caused a strong response in the national consciousness. Then came the official utterance, in time-honoured form. It was said that if all the facts were known there would be no tragedy; that there was a statutory obligation upon all local authorities to relieve need where need was proved. It was the truth, but an example of how the truth could be uttered with disastrous effect. For there was no definition of need. The local authorities were the umpires of need and could refuse help or not as they thought fit. Dr. Lyster was a member of a public assistance committee in a reactionary district, which decided not to help anybody who was in receipt of unemployment pay. It was given out that it would be useless for such people to apply. Such conduct was the cause of much starvation. There must be national standards. Otherwise local authorities were free if they wished to disregard their statutory obligations. Taking another example, Dr. Lyster said that about a year ago it was beginning to come home to people that there were millions of their countrymen below the starvation level. All authorities reported an increase in sickness and tuberculosis. The decline in tuberculosis was arrested as it had been during the war. Figures published at this time showed that four shillings and sixpence was the amount allowed by poor-law institutions, who could not be thought to be unreasonably indulgent, and had the advantages of institutional catering, to keep a child in health, while the State allowed two shillings. At this point we read in the report of the Ministry of Health that "there was no available medical evidence of any increase in sickness or mortality owing to depression or unemployment." If this evidence was not available at the Ministry of Health, Dr. Lyster said, the Ministry of Health was the only place where it was not available. The report also pointed out that except in localised areas there had been no increase in physical disability owing to unemployment. In fact, Dr. Lyster said, if we ruled out the bad places, England was doing well. When the Ministry of Health declared that there was not much available evidence it meant that there was not much of this evidence in the reports of medical officers of health for 1932, but the officers were bound by restrictions. Also although the public health service was preventive in aim, it only met the casualties. The Ministry of Health was waiting for the casualties of malnutrition. Again, in the Maternity and Child Welfare Acts of 1918 and 1929, the care of the mother and the young child was given over to the local authority. There was no limit to what might be spent. Yet the local authority commonly neglected this charge. In the same way the power under the Education Act to provide free meals for school-children was neglected. Local authorities entrenched themselves behind the terminology of the Acts, which said "may" instead of "shall."

For £7,500,000 a year half a pint of milk could be given to every elementary school-child in the country daily, but in the present state of legislation, Dr. Lyster said, it was difficult to say what milk was. There was no standard either of cleanliness or of quality. Milk was anything that could be proved to have been squeezed from the udder of a cow. Proof was by the oath of the vendor and his milkman. A county bench of Dr. Lyster's acquaintance had the stainless record of having dismissed every milk prosecution brought before it in twenty years. People were naturally giving up hope. In another famous milk prosecution it had been proved to the satisfaction of the judges that a normal constituent of milk was cow manure.

STANDARDS OF NUTRITION

Prof. **J. B. S. Haldane** said that it was now known what people needed in the way of food. It was no longer a matter of theory. The scientist working on this subject in the laboratory had come to the same conclusion as the worker in other fields. We could lay down a definite standard of nutrition. It used to be thought that as long as a certain number of calories were supplied to the body it did not matter in what form. A fact known now was that proteins had specific dynamic action, that they produced more heat than other foods for the body when it was at rest. It was known that protein was necessary for repair and growth, and was therefore of particular importance to children. It was known that all proteins were not equally good. The right kind of protein cost more than the wrong. The need for the inorganic constituents of food, for lime, phosphorus, and salt was now understood, also the necessity of vitamins. The lack of vitamins did not show for a long time. Teeth, for instance, would be bad in later life owing to lack of vitamins in earlier life. Thirty years ago it was conjectured that "a little of what you fancy does you good." We were now able to give this important statement a more scientific form. When research made a standard possible, then it was time for public action. It was only sixty years since a standard for water had been discovered. Since then cholera and other diseases from bad water had disappeared. We could do the same about food as our ancestors did about water. If our ancestors of the eighteenth century had demanded a pure water-supply from their government they might reasonably have been refused. Neither the knowledge nor the pipes for conveying water were in existence. But now both the food itself and the knowledge about it were in existence. The food-supply, like the water-supply, should be part of the public health service of the country.

Mr. LE GROS CLARK, hon. sec. of the committee, said it owed its foundation to the belief that thousands of people were perturbed about under-nourishment and did not know what individually to do. The committee wished to make practical proposals to these people and to give them information to be used as the basis for logical discussion. With such information they could undermine complacency, which would be left without an argument against proper feeding for all. The committee could elucidate, for instance, the position of local authorities of the type Dr. Lyster described. It could inform its associates, who must be for the most part ignorant on this question, how milk and free dinners were supplied to children in L.C.C. areas. It could give revelations of conditions in various parts of the country. It could give people the stimulus to get to work locally and to start movements locally, out of which a national movement would grow.

An eager discussion followed the set speeches. Dr. ELWIN NASH, having declared his sympathy with the aims of the committee, said that it was impossible to lay down a standard of nourishment. He described his practical researches into the subject of food and his attempts to provide a satisfactory diet on the very smallest amount of money. It was objected that this was an attempt to put up with malnutrition rather than to overcome it. A dietetic experiment made in Scotland was quoted, in which half of a number of children were fed with certain supplementary substances to see if they improved therewith, and half were not. No difference was noted, so that the result was nil, but there was a conclusion—namely, that all the children were too undernourished for the experiment to have any effect. Several teachers spoke of the impossibility of administering education to children who needed food.

CLYDACH WAR MEMORIAL HOSPITAL.—A children's ward of this hospital, with eight beds, nurses' quarters, and the usual appurtenances, which has cost £2000, was opened recently. The Mond Nickel Company and Messrs. John Player and Sons undertook to bear between them such part of the cost as was not covered by subscriptions. The ward is a memorial to the late Mr. John Player, a benefactor, and a tablet to his memory was unveiled by his son, Mr. W. J. P. Player.

MEDICINE AND THE LAW

Problems of Miners' Nystagmus

THE Workmen's Compensation Act was amended in 1931 to remove doubts arising out of litigation about miners' nystagmus. In the House of Lords last week Lord Tomlin said it was a pity that the 1931 amendment had failed to make the position clear. In Bevan *v.* Nixon's Navigation Co. the miner had suffered from nystagmus, an industrial disease which counts as an accident within the course of the man's employment. Unfitted by his disability for his old work at the coal-face, Bevan was able to do light work on the surface at the colliery, but no such work was available. In the circumstances was he still to be deemed suffering from the industrial disease and was he entitled to compensation as for total incapacity? Bevan having lost his case in 1929, the 1931 Act attempted to give a remedy. Thenceforth compensation was to be given to men in his situation if (*a*) they would probably be able, but for the continuing effects of their injury or disability, to obtain work in the same grade in the same class of employment as before the disablement, and if (*b*) their failure to get work was wholly or mainly a consequence of the injury or disability. In French *v.* Archibald Russell Ltd. (the case before the House of Lords last week) the medical referee certified that French was "recovering from an attack of miners' nystagmus, and his condition is such that he is fit for his usual work as a miner." The evidence showed that no colliery in Scotland will employ a workman underground unless he can sign a declaration that he has not previously suffered from miners' nystagmus. Obviously French could not truthfully sign such a declaration; consequently he could never get work below ground in the same grade and in the same class of employment as before the disablement. Was his inability to sign the declaration one of the "continuing effects" of the industrial disease? The Scottish courts held, and the House of Lords has now held also, that the words "continuing effects" must relate to the physical state of the workman and not to any artificial conditions imposed by the employers. Thus the workman loses his appeal and Parliament will probably be asked to try once more to clarify the law.

Two Disablements from One Disease

Another nystagmus case occupied the Court of Appeal last week on a different point. In Timmins *v.* Brodsworth Main Colliery the miner was certified in April, 1928, to be suffering from miners' nystagmus. No date was given for the disablement caused by the industrial disease, and therefore (under Section 43 (2) of the Act) the date of the certificate was reckoned as the date of disablement. Timmins, the miner in question, was paid 30*s.* a week for compensation at the full rate till September, 1929, when he went back to try his old work again. He worked till January, 1930, when his eyes gave him trouble and he had to stop. From this point he was once more paid compensation at full rates until the following October when light work was found for him on the surface till January, 1932. Afterwards he resumed his old work underground for most of 1932, but eventually he had to stop owing to a septic throat and eye trouble, and on Jan. 7th, 1933, he was certified for the second time to be suffering from miners' nystagmus. In this second certificate the date of disablement was again left blank, so that again the date of disablement was the date of the certificate.

Timmins was now paid compensation at the rate of 24*s.* 7*d.*, based on the reduced wages he had been receiving up to the date of the second certificate. He reasonably contended that his second disablement was a recrudescence of the same industrial disease as had caused his first disablement; he therefore claimed to go back to compensation at the original rate of 30*s.* The county court judge agreed with him, finding as a fact that there had been no complete recovery from the original disease. But the Court of Appeal has overruled the county court and has decided in favour of the employers. The Master of the Rolls says that, when Timmins went back to his old work, it was an overt act, indicating that the effects of the first disablement (or "accident") had passed away. By leaving blank the date of the second disablement the certifying surgeon had unequivocally declared that date to be the date of the certificate. The county court judge had no evidence on which to ignore the definite date assigned to the second disablement, and the workman was not at liberty to choose which of the two certificates might best suit his claim. Lord Justice Romer concurred with the view of the Master of the Rolls but, as the workman secured a minority opinion in his favour from Lord Justice Slesser, the case will doubtless be taken to the House of Lords.

LONDON AND COUNTIES MEDICAL PROTECTION SOCIETY

ANNUAL MEETING

THE annual meeting of this society was held on Wednesday, May 30th, at Victory House, Leicester-square, when the President, Sir John Rose Bradford, moved the adoption of the report and statement of accounts for the past year, drawing attention to the position and work of the Society. He was able to record a notable increase of activity during the year both in the number of applications for advice and in the number of cases that required serious consideration, and he added that many settlements had been arrived at which, as shown by letters afterwards received, had proved satisfactory to the members. While, however, he said the membership of the Society had increased, he felt obliged to point out that many doctors, perhaps one-third of the men on the Register, were not members of any defence society, a position which he held to be no exaggeration when it is described as appalling, considering the multifarious risks to which the doctors are exposed in the course of practice. He referred to the death of Sir George Makins, a very old member of the Society who had acted as vice-president and who, though taking little part in the routine business, had shown himself greatly interested in their activities. Sir John closed with an eloquent testimony to the officers of the Society, and the motion that the annual report and statement of accounts and balance sheet should be adopted was carried unanimously.

The meeting proceeded to the election of officers. Sir John Rose Bradford was re-elected president and re-election was also extended to the vice-presidents to which body Sir William Hale-White and Sir Cuthbert Wallace were added. Dr. C. O. Hawthorne endorsed Sir John Rose Bradford's words as to the risks run by practitioners who belong to no defence society and said that the British Medical Association took every opportunity of urging upon the younger members of the profession to become members of one of the defence societies, but, he added, the annual report before the meeting had led him to conclude that it is no less important that members of the profession of riper years should maintain their association with one of these bodies; these might also, through their influence, bring their colleagues into the fold.

Dr. R. L. Guthrie, who was unanimously re-elected treasurer, made a brief statement as to the situation of the finance of the Society for 1933, describing the balance sheet and accounts as disclosing a satisfactory position. The assets had increased by over £5000, and there had been an appreciation of nearly £10,000 in the value of the investments, but he warned the audience that the present position of gilt-edged securities was not permanent, and that some of the appreciation would disappear. The facts that the legal expenses for the year were down, and that the liabilities for costs and damages were lower by nearly £3000 were mentioned, but Dr. Guthrie believed that the circumstances of 1933 were exceptional, while expenditure in the current year might be larger on account of certain outstanding cases.

Dr. C. M. Fegen was re-elected as secretary, a resolution to that effect being carried with applause, as his complete familiarity with the onerous and responsible duties was well known to the meeting. A cordial vote of thanks to Messrs. Le Brasseur and Oakley, solicitors to the Society, elicited the information that during 1933 the firm had dealt with about 650 questions and cases.

At the close of the meeting at the instance of Prof. Mary Lucas Keene appreciation of the work of the president, Sir John Rose Bradford, was warmly expressed.

IRELAND

(FROM OUR OWN CORRESPONDENT)

FINANCIAL POSITION OF THE IRISH HOSPITALS

THE Hospitals Commission, which was appointed last September by the Minister for Local Government and Public Health to advise him on the distribution of the funds accruing from the hospitals sweepstakes, has presented a preliminary report dealing with the financial position of the hospitals participating in these sweepstakes. The report points out the difficulties arising from the absence of a uniform system of accounting in the different hospitals. The Commission, therefore, prepared a system and requested the hospitals to adopt it, fixing the end of their financial year at Dec. 31st of each year. The hospitals willingly accepted the scheme, and thus for the first time in the history of the Irish hospitals it has been possible to make a review of hospital finance. The report states that 35 hospitals show for the year 1933 deficits amounting to £65,000; 15 hospitals show a surplus. The amount invested by the voluntary hospitals out of sweepstake funds is £1,451,000. The total deficits, if income from the funds so invested had not been available, would have amounted to £105,000. The sum required to meet the net deficits, if capitalised at 3½ per cent., would be £1,800,000. The Commission noted, comparing the years 1929 and 1933, the only years for which figures are available, that there has been an increase in the number of free patients of from 10 per cent. to 50 per cent. If this were an indication that a larger number of patients unable to pay for treatment were now receiving free treatment, it would be a high tribute to the usefulness of the sweepstakes. The Commission do not draw this conclusion, but point out that many of the hospitals complain of an increasing difficulty in receiving payment from patients who are in a position to pay, since the public appear to believe that the sweepstake fund has now reached a figure whereby all may be treated free. "Until such a time," the report goes on, "as hospitals have developed a system whereby patients in a position to pay can be identified without difficulty, a continuance of the present heavy deficits on maintenance, if not an actual increase, may be anticipated." Such a system is at present being devised, but considerable time must elapse before its application will be feasible. The Commission have observed also that since the advent of the sweepstakes there has been a notable decrease in voluntary subscriptions, a factor which also tends to increase the working deficits. Taking a representative group of seven hospitals there was, from 1929 to 1933, a drop of 67 per cent. in voluntary subscriptions.

Passing from the working requirements of the existing hospitals, the Commission consider their plans for development in the future. The claims of the hospitals for increased accommodation amount to close on 3000 beds. If these claims were met, and assuming that half the beds were self-supporting, a modest estimate of the additional deficit would be £150,000 a year, or, at 3½ per cent., a capital sum of over £4,000,000. The capital cost of providing, equipping, and furnishing the additional bed accommodation claimed is estimated to be approximately £7,000,000. From a consideration of the expected income from sweepstakes and the other calls on such funds, the Commission estimate that it will take approximately seven years before the financial position of the voluntary hospitals as reconstructed, enlarged, and equipped in accordance with the claims submitted, will be secure. It may be that the claims are in some degree excessive; the Commission emphasise the necessity for moving slowly where expenditure of large sums is proposed, except in cases where rebuilding, extensions, or alterations on a large scale present "in addition to their urgency, such an improved hospital service that the risk is well worth the taking." In conclusion, the Commission state their desire to establish a hospital system of which the country can be proud and their appreciation of the coöperation shown by all those concerned in hospital management. The report, brief and general as it is, shows a sound grip of the financial situation and embodies a great mass of work and serious thought.

PARIS

(FROM OUR OWN CORRESPONDENT)

THE ACRODYNIA OF YESTERDAY AND TO-DAY

In a recent communication to the French Academy of Medicine, Dr. M. Péhu[1] of Lyons drew attention to the curious vagaries of a disease which a century ago swept down on Paris with fulminating violence and which lasted only for two or three years. It seems to have died out, completely escaping notice for some fourscore years, and then to crop up again as an endemic but comparatively rare disease, with certain salient features profoundly modified, and yet retaining so many of its original characteristics that there can be little doubt as to its identity in the two periods. When acrodynia overtook the Parisians about 1827, its ravages were such that some 40,000 cases were recorded during a brief interval. Chomel described it with more truth than accuracy as a "maladie actuellement régnante à Paris." The term "chiropodalgie" was more informative, but it was discarded in 1930, when Chomel returned to the charge with the more appropriate title of acrodynia which has survived. According to the records of 1830, the disease gave rise to disturbances of the cutaneous, nervous, digestive, and respiratory systems, with involvement of the sweat glands. Symmetrical redness of the hands and feet ceased suddenly at the ankles and wrists. Brown, and even sometimes black, discoloration developed, desquamation was frequent, and the attacks of pain were refractory even to large doses of opium. Children were much less liable to the disease than adults and the aged, and the mortality was far from negligible. The disease disappeared as mysteriously as it came, and nothing was heard of it again till 1903, when a Dr. Selter, of Solingen in the Ruhr, published a very detailed report of a case. In 1916 the Australian, Swift, rediscovered the disease, and Weston in 1920 restored its old and proper title to it. During the past 30 years it has cropped up only now and then and has shown a predilection for childhood, notably from 1½ to 5 years. But slightly contagious, the disease runs a slow course of several months and usually ends in recovery. Relapses are exceptional. It is, indeed, a remarkable fact that, with so many different manifestations, cutaneous, circulatory, nervous, and nutritional, the disease should clear up ultimately without leaving any permanent ill-effects. This problem of a disease which undergoes profound changes in the course of a century is of exceptional biological and epidemiological interest.

TYPHOID FEVER IN PARIS IN 1933

The behaviour of typhoid fever in Paris last year was both instructive and puzzling. Quite recently great improvements have been effected in the Paris water-supply by chlorination and expert interference with the hitherto deplorably common and fortuitous liaison between drinking and other water. Considered as a water-borne disease, typhoid should, therefore, have shown a definite decline last year. So it did, but only up to a certain point. In 1931 1324 cases were notified, and in 1932 1251. From the first of January, 1933, to November of the same year, only 473 cases were notified, and it looked as if this year was going to set a record. But it was badly spoilt when an epidemic broke out in November and claimed still more victims in December, with the result that 922 cases had to be recorded for the whole year. This outbreak coincided with exceptionally cold weather—a factor of considerable importance in a town like Paris in many of whose cellars water may be tapped from two sources—drinking water, and washing water straight from the Seine. This water is the cheaper of the two, at any rate at the moment, and when pipes are frozen or burst, the claims of false economy are re-enforced by dire necessity. The authorities are now trying to eliminate the temptation which this double water-supply offers. Though polluted water was probably responsible for much of the typhoid, no very convincing correlation could be established between the distribution of the cases and the various water-supplies of the areas in which typhoid was most rife. Nor could any foodstuffs or carriers be singled out for special blame. So typhoid remains still, to a large extent, an unsolved problem with us.

UNDULANT FEVER IN LORRAINE

Thanks to the investigations of Prof. Jacques Parisot of Nancy, assisted by Dr. Robert-Lévy, the ravages of undulant fever in Lorraine have been brought to light, and measures have been taken to limit its further spread among human beings and cattle. A little more than three years ago the disease was non-existent, or at any rate unknown in this area, and in 1929 only two cases came to light. This figure rose to 20 in 1931, to 31 in 1932, and to 43 in 1933. All these 96 cases have been confirmed by bacteriological examinations. It is, of course, not clear how many other cases have escaped detection; the approximate ratio of slight and abortive to clinically well-defined cases is as yet unknown. Among the 96 cases were three deaths. Encouraging results have already followed the chlorination of the water-supply in certain districts, and it is on these lines that the authorities hope to combat successfully not only undulant fever but also typhoid fever and other water-borne diseases in this area.

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[1] Bulletin de l'Académie de Médecine, tome cxi., No. 15, 1934.

EVACUATION OF THE WOUNDED BY AEROPLANE IN MAROCCO

An account given in *la Presse Médicale* for May 9th of the campaign in Marocco in 1933, Dr. R. Charlet draws a vivid picture of first aid by the air, contrasting it with the older method of terrestrial transport, with its inevitable delays and sufferings. It would seem that the new arm has replaced the old one to such an extent that, during these operations, the air ambulance service found almost as much employment as the motor ambulances. Smoothly as the former worked, reforms were found necessary in two directions. The ambulance aeroplanes were fitted with one type of stretcher, the motor ambulances with others. This meant the painful shifting of patients from one stretcher to another. The other important lesson was that a rough country demands a type of aeroplane capable of negotiating the most primitive landing grounds.

SPECIALIST OR GENERAL PRACTITIONER?

We used here as elsewhere to be either specialists or general practitioners. Now many of us are specialists with general practice as a distracting avocation. Or we are general practitioners whose interest in, and almost profound knowledge of, certain subjects render us specialists *de facto* if not *de jure*. But how is the money value of the services we render (*a*) as general practitioners, and (*b*) as specialists to be assessed? When there is no third party, and we have none but the patient to consider, it is comparatively easy to treat him with discriminating benevolence. When the State becomes a third party to the transaction, as in the case of the insured and pensioners, war or otherwise, elastic compromise must yield to rigid rulings. They have been applied not long ago to the by no means rare case of the general practitioner with an X ray outfit. As a general practitioner he may find the opinion of a radiologist desirable in a given case. Accordingly, the radiologist examines and reports. Dr. Jekyll needs information, and Mr. Hyde supplies it. There is nothing sinister about this dual personality, but it has been found to cost the State too much. The State now honours the bills of only those radiologists whose patients have been referred to them by another doctor. It is laid down that one must be either a specialist or a general practitioner; it is not possible, under the conditions described, to be a facultative specialist or an optional general practitioner.

PAYMENT FOR BLOOD TRANSFUSION

As from April 1st, 1934, blood donors in military hospitals in France are to be paid according to a certain scale, 50 francs being the price of the first 150 c.cm., and 50 francs for every supplementary 100 c.cm. These charges are doubled when the donor has been artificially prepared for an immuno-transfusion.

PUBLIC HEALTH

SWIMMING BATHS AND HEALTH

The healthy urge to bathe in the fresh air received little official encouragement until recent times. Well into this century those who wished to swim at any other time than the summer holiday, and who lived far from natural ponds or rivers, were obliged to indulge their craving in small rectangular pools surrounded by a narrow gangway giving access to a row of small clammy cells. The dust or mud deposit on the gangways from the bathers' shoes was for the most part carried into the bath on their feet after undressing. The water was changed perhaps two or three times a week—on days well known to the more experienced bathers. Fresh air and direct sunshine were excluded by a skylight, and by the time the bath came to be emptied the water was of a grey colour and so opaque that bathers could drown, and not infrequently did, without being noticed.

All this is changed. Swimming has become a popular pastime, and every up-to-date municipality provides open-air baths where persons of both sexes can swim, bathe, and bask in the air and sunshine. The extensive use of swimming baths has led to a much better lay-out, and continuous purification of the water is fast replacing intermittent emptying; in fact many baths are so large that the time needed for emptying would put them out of use for an inconveniently long period, and the cost of repeatedly heating such a volume of water would be prohibitive. The assembly of large numbers of bodies in a limited mass of water which is not renewed, but only made up to constant volume, and in which they may spend hours at a time and take active exercise, may lead people to ask their doctors whether they or their children should go to public swimming baths, and the answer needs some consideration.

Every bather, however clean his habits, brings into the bath not only the dirt from his shoes, but dried sweat, grease, bacteria, probably moulds, and miscellaneous dirt accumulated on his skin. After a day at school or at work this accumulation may be considerable, especially if his opportunities of washing and bathing are small. The individual contribution to the bath water may seem insignificant, but if every bather enters the water without preliminary ablution it will soon become obviously dirty as well as bacterially contaminated. Infection of the mucous membranes and of the middle ear have frequently been associated with bathing, and in any case few people would care to bathe in dirty water if they were offered clean. It is therefore desirable that bathers should not reach the undressing rooms by walking along the edge of the bath, and that they should have some means of cleansing the skin, and especially the feet, before entering the water. This can be done by making them pass on their way to the bath under a shower of sterilising water and through a trough filled with similar water. As some do not like cold showers, it may be advisable to have this water warmed. The best way of cleansing the feet is by means of a spray which impinges on a raised platform on which the foot can be placed; this is likely to clean the spaces between the toes which are specially subject to cracks and sores. All this applies to relatively clean people. Others should have further opportunities of cleansing or be sent away.

Having regard to the effect of cold water on urinary excretion it is desirable that urinals should be situated on the way to the bath, and that children should be required to use them before going into the water.

A bath may be used by none but the cleanest bathers and yet the originally clean water will become contaminated with both dirt and bacteria. Only in those rare cases where water is derived direct from springs, like the hot baths at Bath and Matlock, is it practicable to let water run to waste through the bath. Some means of continually purifying the water is needed. This is achieved by pumping water from the deep end of the bath, coagulating the suspended impurities to form a thin turbid emulsion, filtration through sand, and final sterilisation of the now clear and relatively organic matter-free water. Alum or its equivalent followed by lime is commonly used as coagulant. Sterilisation may be brought about in a variety of ways; the most usual is chlorination, but ozone, catadyn silver, and ultra-violet radiation are all effective if properly used. The process of continual purification if successful will give water which is bright and attractive. As the bottom of the bath is always visible the responsible attendant will be able to see anyone who is in difficulties under water, while such things as cigarette or chocolate cartons and used costumes are less likely to be thrown into water in which they can be seen. The platform surrounding the bath should slope away from the water, and a channel a little above the water level serves both as handrail and spittoon.

Doctors who are consulted by their patients about swimming baths should certainly advise them to avoid public baths not fitted with filtration and sterilisation plants.

Treatment of Bath Water

Small baths can be kept in tolerable condition by simple chlorination, either with chloride of lime or more conveniently with a solution of sodium hypochlorite such as Chloros, if care is taken to add so much as will maintain a suitable excess of free chlorine. One ounce per 6000 gallons is equal to one part per million, and this amount of chlorine is contained in three ounces of good bleaching powder or ten fluid ounces of chloros. To a bath full of clean water rather less than one part per million of free chlorine should be added, care being taken to distribute evenly, and the free chlorine content should be kept up by additions to 0·2–0·5 part per million. This requires daily tests of the water with ortho-tolidene, comparison being made with coloured solutions representing the permissible limits. If the upper limit is not exceeded the water is unlikely to irritate the eyes, and if the lower limit is not reached sterilisation is likely to be unsatisfactory.

FILTRATION

The water will not remain clear for prolonged periods and must be changed before it becomes so turbid that the bottom of the bath at the deepest part is invisible. The use of ammonium salts will help matters, but larger doses of chlorine must then be used and control becomes difficult. Without filtration chlorination is but a makeshift, at best only securing sterility of the water and effecting some economy in its use. The only satisfactory treatment is filtration after coagulation, followed by sterilisation of the clear water, already freed of grosser impurities. This preliminary clarification enables a choice of sterilising agents to be made, and their amount to be cut down to a minimum. The bath is worked as a circulating system and, once filled, very little make-up water is needed to replace losses by evaporation, splash, or overflow at scum channel.

Although some of the impurities introduced into bath water during use can be removed by simple filtration—some indeed, e.g., dead leaves, bathing costumes, by mere straining through a coarse-meshed grid—it is in every way better to introduce into the strained water as it is pumped from the bath a small predetermined dose of a soluble aluminium salt (alum or "alumino-ferric"), followed, if necessary, by sufficient of an alkaline solution (soda ash is the most convenient) to make the liquid alkaline as tested with phenolphthalein. The precipitated aluminium hydroxide will separate with it, either mechanically or by coagulation of colloids, the fine matters in suspension which cause turbidity, as well as those in quasi-solution, in a state removable by filtration through sand. The clear water which passes from the filter contains only matters in solution and bacteria, which have not been removed by the previous processes. Whatever sterilising agent is now used will not be spent in effecting changes on any other impurities than micro-organisms.

STERILISATION

The most common sterilising agent is chlorine, which is best used as gas from steel cylinders. Several firms make plant for coagulation, filtration, and chlorination which is practically fool-proof and requires little attention. If for any reason the handling of a gas cylinder is undesirable the hypochlorite solutions already mentioned can be used; an electrolytic cell is obtainable, specially suitable for small baths. As chlorine is an irritant both to the eyes and nasal passages the amount must be regulated. A simple colour test, with standard limiting tints representing the minimum useful content of free chlorine and the maximum proportion which most persons can tolerate with comfort, is usually supplied with the plant for treatment. The water leaving the bath should contain the minimum and that entering approximately the maximum.

Where an electric supply is available the use of ozone or of ultra-violet rays is worthy of consideration. Ozone has been used largely on the continent for sterilising drinking water, and a plant erected at Barn Elms by the Metropolitan Water Board not only sterilised the water but greatly improved its colour. The residual dose can easily be adjusted so that there is only the merest smell of the gas, which is not unpleasant. Ultra-violet light can be used successfully to sterilise clear well-filtered water and is effective when none of the water flowing past the lamp is more than 12 inches from it and the exposure lasts at least 4 seconds. It should be easy to use a much smaller working distance than this. Advantage may well be taken of the formation of ozone in the region of the lamp, by letting the ozonised air flow through the water, thus giving it some residual sterilising power in its passage through the bath. The shorter waves appear to be the most effective.

A method of sterilisation unlike all the others is the Catadyn process in which the filtered water on its passage back to the bath either flows over sand coated with silver, or a portion of this returning water flows past two silver electrodes between which a small current passes. An extremely small amount of silver ions goes into the water from the anode. The silver introduced in this way or from sand possesses remarkably high sterilising power, provided the water is relatively free from organic matter other than bacteria. No smell is imparted to the water, which retains a sterilising power for some time, exerting an inhibitive effect on green growths. This oligodynamic action of silver and other relatively noble metals, although not well understood, is simple to apply and merits further study.

The economic use of filtration and sterilisation is now made easy by the many makes of plant for this purpose.

A Hop-picking Dispute Settled

As our readers will recall, difficulties have arisen for some years past about the responsibility for the treatment of infectious disease occurring among Londoners who had gone to pick hops during the season in Kent. Last year the London County Council were unwilling parties to the transference of two cases of diphtheria from Kent to their homes in St. Marylebone, and the L.C.C. asked the Minister if it would not be possible to make it obligatory on a local authority to treat persons suffering from infectious disease temporarily resident within its district. As a result of this request the following new regulation is to come into force on July 1st next:

> The London County Council, the council of every borough or urban or rural district and every joint hospital board constituted under the Public Health Act, 1875, and having the powers of Section 131 of that Act, shall have the same powers and duties in relation to the provision of hospitals or temporary places for the use of persons who are for the time being within their county, borough or district, as the case may be, and are suffering from infectious disease, as they have for the use of the inhabitants of that county, borough or district.

The L.C.C. has informed the Minister of its willingness to enforce a regulation of this kind.

At its meeting on Tuesday the London County Council agreed to the proposal of its hospitals and medical services committee to remove to St. James' Hospital the plastic surgery unit at present at Hammersmith Hospital. The transfer will take effect on August 1st next. The arrangement includes the provision of one position of plastic surgeon and one of assistant plastic surgeon for one session a week each at a salary of £125 a year.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED JUNE 9TH, 1934

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 2 (last week 2); scarlet fever, 2368; diphtheria, 1101; enteric fever, 16; acute pneumonia (primary or influenzal), 939; puerperal fever, 60; puerperal pyrexia, 110; cerebro-spinal fever, 24; acute poliomyelitis, 3; acute polio-encephalitis, 2; encephalitis lethargica, 5; dysentery, 7; ophthalmia neonatorum, 89. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on June 18th–19th was as follows: Small-pox, 3 under treatment, 0 under observation (last week 3 and 0 respectively); scarlet fever, 1624; diphtheria, 1686; measles, 1750 (last week 1890); whooping-cough, 281; puerperal fever, 22 mothers (plus 6 babies);
269; poliomyelitis, 2; "other disease
Hospital there were 20 babies (plus 7
neonatorum.

Deaths.—In 121 great towns, including London, there was no death from small-pox, 3 (0) from enteric fever, 60 (22) from measles, 5 (2) from scarlet fever, 27 (6) from whooping-cough, 30 (4) from diphtheria, 45 (21) from diarrhœa and enteritis under two years, and 36 (6) from influenza. The figures in parentheses are those for London itself.

Brentford and Chiswick, Southampton, and Worcester each reported a death from enteric fever. Stoke-on-Trent reported 5 fatal cases of measles. Salford 4, Newcastle-on-Tyne 3, no other great town more than 2. Liverpool reported 5 deaths from whooping-cough, Birmingham 3.

The number of stillbirths notified during the week was 271 (corresponding to a rate of 39 per 1000 total births), including 52 in London.

PANEL AND CONTRACT PRACTICE

An Election without Enthusiasm

THE Ministry of Health has decided to keep the present personnel of insurance committees in office for another three years and the Insurance Acts Committee has, with a show of reluctance, agreed to this course. On the other hand the panel committee for the County of London goes out of office at the end of this month and a new committee is now in the course of election. The machinery for this is elaborate. Every practitioner on the medical list is furnished with a list of names and addresses of those eligible for election, who include any doctor in practice on his own account or in partnership. Assistants are not eligible. Each borough has so many seats on the committee according to the number of insurance practitioners in its area. A returning officer is appointed and approved by the Minister; nomination forms are sent out and signed by the candidate as willing to serve after being proposed and seconded by two members of the profession in that area. The date of election is then fixed and a voting paper sent to every insurance practitioner, giving the names of candidates nominated in his borough. The completed voting paper may be posted to the returning officer to reach him not later than the morning of the appointed date or it may be handed to the returning officer at the agreed meeting place; but it may not be sent by proxy to the meeting. After the election it is usual for an address to be given by someone conversant with the past work of the committee. A speaker is selected who does his best to reply to any questions raised of difficulty under the Act.

How well these elections are conducted, what ample precautions are taken to ensure a proper election—may be the thought in the mind of the uninitiated. The facts are different. In London insurance practitioners do not take the slightest interest in these expensive and elaborate proceedings. A recent meeting held in the Battersea Town Hall for the adjacent boroughs of Battersea and Wandsworth was attended by exactly four doctors. Three of these were old members of the panel committee up for re-election and one was a new candidate to be elected. There were five candidates for eight seats for the borough of Wandsworth; three of those seats remain to be filled. Such elections scarcely justify so expensive a procedure. But it may be time for insurance practitioners generally to be roused from the lethargy in which they appear to be living. Medical men who serve on the London panel committee give their services gratuitously; many of them devote hours each week to the work of committees and subcommittee meetings besides representing the panel on insurance committee, medical service subcommittee or after-care committee, let alone accompanying the regional medical officer when making inquiry about excessive prescribing or improper certification. The apathy is found to disappear when a question of finance arises; practitioners are sure to attend a meeting to protest against a reduction of the capitation fee, or to blame the panel committee for allowing such reduction to take place. But they are unwilling to enter attendances and visits on record cards to enable officials to get a proper measure of the total work done—and thereby definitely hinder negotiations on fees. Practitioners might take more interest in the committee's work if they were to pay their representatives; an alternative would be to make service on the panel committee for a certain period obligatory on all insurance practitioners, a procedure which would meet with certain resistance.

The Record of the London Panel Committee

A brief résumé may now be appropriate of the work of the London panel committee, which represents nearly 2200 practitioners, during the last three years. One subcommittee prepared a long and exhaustive argument against the conclusion set forth by the Government in Memo. 329 in which the medical profession was charged with inefficient certification as a cause of increased sickness claims. This took several meetings each of some hours' duration. The panel committee itself circulated prescribing statistics to insurance practitioners pointing out where they exceed the areal average. Certain members of the committee have given lectures gratuitously on health insurance regulations to senior students of various London medical schools. They arranged a conference between themselves and representatives of approved societies for the discussion of vexed questions such as certification in pregnancy, simplification of rules, and the status of sick visitors.

This conference was held in a friendly atmosphere and was perhaps the best piece of work ever done by the panel committee. A deputation from the committee interviewed the out-patient committee of King Edward VII. Hospital fund upon the general question of out-patient attendance. A memorandum upon the adequacy of the capitation fee was sent to the Insurance Acts Committee—another long and arduous piece of work. The payment for temporary resident treatment in convalescent homes has largely been reduced by its efforts. The panel committee is still trying to obtain a better service of medicine to insured persons after closing of chemists' shops. There are many other actions and decisions in which the committee has taken part in addition to its normal routine work, and of these our columns have perhaps given evidence enough. Perhaps the apathy of the election is really a compliment to those who do the work; it is being done so satisfactorily that there is nothing to complain about.

CORRESPONDENCE

"NEW METHOD OF LOCAL ANÆSTHESIA FOR ABDOMINAL OPERATIONS"

To the Editor of THE LANCET

SIR,—The new method of local anæsthesia for abdominal operations used so successfully by Dr. George Bankoff in over 500 cases and described by him in your issue of Feb. 10th (p. 287) was devised by me 13 years ago (Zentralbl. f. Chir., 1921, No. 23). A survey of the literature on this new method which I named "local anesthesia by intra-abdominal clysis" was published by me ten years later (Ibid., 1931, No. 19). This paper covered investigations of ten authors on the subject. No modification of my original method has been developed as far as I know. Up to 1929 novocain was the anæsthetic of choice. I recommended 0·5 g. of the drug in ¼ to ½ per cent. solution together with adrenaline. The results obtained were quite striking from the beginning. There was no doubt that this method was a simple way towards a complete regional anæsthesia of the abdominal cavity. However, the anæsthesia was not perfect with novocain, as novocain is rather a poor surface anæsthetic. The excellent results reported by Dr. Bankoff on over 500 laparotomies, in spite of the use of novocain, are in my opinion the best compliment for the method itself.

In 1929 a decided step forward is to be recorded with the introduction of Nupercaine (also known as Percaine). This drug proved to be far superior to novocain in its action on surfaces and in its penetrability. No wonder that the very first publication on nupercaine pointed explicitly to the "excellent" results obtained in regional abdominal anæsthesia. The author of this paper, Prof. C. Henschen, of Basle, Switzerland, determined the dosage of nupercaine for intra-abdominal clysis as 80 to 150 c.cm. of the 0·05 per cent. solution, a strength generally adopted by later investigators. Among these were: F. Mandle, Clinic Hochenegg, Vienna; M. Richard, University Clinic, Basle; Prof. A. Eiselsberg, Vienna; Abel, Berlin; G. Neumann, Muerzzuschlag; H. Gangle, Berlin; Prof. E. Payr, Leipzig.

Great care should be taken not to use excessive doses of nupercaine as it is almost as toxic as cocaine. For this reason, nupercaine in its present method of use is as yet not ideal for our special purpose of intra-abdominal anæsthesia. Further research is being carried on, in the hope of developing a less toxic solution by altering the vehicle. There is also a new local anæsthetic, Metycaine, under my investigation that seems to be very active by topical application to surfaces and has a toxicity comparable to that of novocain. Reports published on this anæsthesia corroborate unanimously my favourable results. A number of enthusiastic surgeons proclaimed it the future standard anæsthetic of the abdomen. The veterinary surgeons, Prof. W. Lindner and W. Hinze, University of Berlin, consider the method revolutionary in their special field. Certain advantages of the method are indeed quite superior to other methods of regional abdominal anæsthesia. The administration is very simple. The duration is prolonged—at least twice that of spinal anæsthesia. The intestinal peristalsis is not interfered with, &c.

More details may be found in my above-mentioned survey of the topic. This communication is not so much intent upon establishing priority of the method as against Dr. Bankoff's. It means to encourage other surgeons to give it a fair trial.

I am, Sir, yours faithfully,

MAX BARUCH,

Director, Surgical Department, Central Neurological Hospital, New York City.

June 3rd.

HISTAMINE IN RHEUMATISM

To the Editor of THE LANCET

SIR,—The article by Dr. B. Shanson and Mr. C. G. Eastwood in your last issue (p. 1226) is of interest [illegible] confirming work already published on the and in this country on the effects of histamine in rheumatic conditions, but a more detailed account of the clinical results in the various types of cases treated would have been of value. Only one type of case seems to have shown marked improvement when treated by the hypodermic method—viz., peri-articular arthritis in the hand with circulatory disturbance. They were unable to obtain any clinical evidence of the characteristic histamine effect by ionisation methods and attribute the results to local galvanism, heat, and counter irritation only. They are alone in this finding however, as other observers appear to obtain readily the complete gamut of physiological effects by this method, as by the use of histamine hypodermically.

That the response to histamine varies from patient to patient and at different times in the same patient is surely an argument against injection, as ionisation can be so regulated that no untoward systemic symptoms need ever arise. Having prescribed over 3000 histamine treatments at the Royal Baths, Harrogate, during the last three seasons, my findings are that good results may be definitely obtained in many types of rheumatism. Identical results are reported by Dr. McKenna and various continental writers. I am, Sir, yours faithfully,

Harrogate, June 12th. A. A. BISSET.

THIOL-HISTAMINE

To the Editor of THE LANCET

SIR,—My attention has been drawn to certain articles you have published recently upon preparations of histamine for rheumatism, wherein whatever credit is due for their discovery has been given to German workers. I introduced thiol-histamine in 1917, since when I have used it on a large scale. Frequent references have been made to the preparation in my works on the Nature of Disease, and you were kind enough to publish a letter for me on May 6th, 1933. May I ask you to be so kind as to correct the omission to which I am referring.

I am, Sir, yours faithfully,

J. E. R. MCDONAGH.

Wimpole-street, W., June 16th.

DISTRICT ALMONERS

To the Editor of THE LANCET

SIR,—It is now generally recognised that almoners are indispensable in all our hospitals; and suggestions are being made that there should be district almoners, whose services would be available to all.

It is unnecessary to tell those who have worked on the visiting or resident staff of a hospital in recent years what an almoner can do, but there must be many in practice who have never been able to write upon a hospital patient's card "Will the Lady Almoner please do this or that," and consequently many who do not realise how much an almoner can do to help to get the best results out of treatment. It will interest these to know that the almoner can usually procure all those things for a patient that doctor or nurse cannot procure: abdominal belts, and all other types of surgical appliances, extra nourishment or particular articles of diet, dressings, and special care of any sort for those otherwise unable to obtain them.

Patients with advanced cancer; those with Graves's disease whose home conditions are unsuitable; children who have come from a distance for the specialist's opinion are recommended treatment with rest in bed and may not even have a bed to themselves; all these and many other similar cases can be dealt with by an almoner.

Convalescence can be arranged, and although the patient at first mention of this may fear the loss of his job by so long an absence, yet it is usual to find that an almoner can approach his firm and get over this difficulty, often obtaining a grant partially to cover the cost.

Naturally the services of an almoner are not for the well-to-do, but with the assistance of a district almoner practitioners could give better service to their patients, such a large proportion of whom are in varying degrees of domestic or financial difficulties.

It would be interesting to hear the views of other practitioners on this subject as it is felt that before further steps can be taken it is necessary to have an idea of the support that can be obtained.

I am, Sir, yours faithfully,

GEOFFREY HALE.

Eccleston-square, S.W., June 16th.

CONTINENTAL ANGLO-AMERICAN MEDICAL SOCIETY

To the Editor of THE LANCET

SIR,—On July 27th at 12.30 P.M. this society will meet for luncheon at the Bournemouth Pavilion on the occasion of the B.M.A. annual meeting. It is hoped that all former members now resident in Great Britain will endeavour to attend on the first such occasion since the war. Any doctors attending the meeting who have patients wintering on the continent will be welcomed at the luncheon. Those who wish to be present should communicate with Dr. E. L. Gros (President) 23 Ave. Maréchal-Foch, Paris, Dr. R. Pryce-Mitchell, Villa Henri, Monte-Carlo, or with the undersigned.

I am, Sir, yours faithfully,

TOM A. WILLIAMS.

Royal Societies Club, 63, St. James's-street, S.W.1,
June 19th.

BIRMINGHAM HOSPITALS CENTRE.—The Prince of Wales will lay the foundation-stone of the *Birmingham* Hospitals Centre at Edgbaston on Oct. 23rd. On the same day he will cut the first sod on the site of the Birmingham University Medical School, which is an integral part of the hospitals centre project. It is expected that the first portion of the new hospital will be ready for opening in October, 1937.

SCARBOROUGH HOSPITAL.—The detailed plans for Scarborough's new hospital, which is to be built at a cost of over £100,000, are now available. The buildings are to be fireproof, and as far as possible soundproof. Advantage has been taken of a sheltered situation to have large sunny balconies and a solarium for the children. The hospital will have 140 beds, including a number for paying patients, and three operating theatres. The theatres have a ventilating plant which makes it possible to change the air or raise or lower the temperature very rapidly. The X ray therapy and light treatment departments and the massage and orthopædic rooms are on the ground floor and are connected by two bed lifts with the wards. The out-patients' department has a large waiting-room where there will be a refreshment counter, and a shelter for prams has also been provided. The dispensary is easily accessible both to the wards and to the out-patients' department. The kitchen is a self-contained unit and the food will be served from heated trolleys so that appetising and hot dishes may reach the most distant wards. The laundry and boiler room are also self-contained, and a supplementary electrical battery room will be able to provide current for the operating theatres and other parts of the institution if the municipal supply should fail. There are rooms for the visiting and administrative staff in the main building, and a separate home for the sisters and nurses.

OBITUARY

MICHAEL GEORGE FOSTER, M.D. Camb., F.R.C.P. Lond., O.B.E.

We regret to record the death of Dr. Michael Foster, the well-known authority on climatology, which occurred on Saturday last, June 16th, at Fincham, Norfolk, the home of his mother's family, after a short attack of pneumonia.

Michael George Foster was born in 1864 at Huntingdon, the only son and elder child of Sir Michael Foster, the famous Cambridge professor of physiology. Huntingdon was the private home of his father, while his grandfather, also a Michael, had been a surgeon in the same city. The childhood of the young Michael coincided with the remarkable development of the Cambridge science schools under his father, and he knew many who later became leading teachers as big boys.

DR. MICHAEL FOSTER

[*Photograph by Elliott & Fry*

Foster was educated at University College School, London, and Trinity College, Cambridge, and graduated with honours in the Natural Science Tripos in 1884. He entered Trinity too young to be a competitor for academic honours, but he acted as a junior demonstrator of physiology in the University. He proceeded for his medical education to University College Hospital, where he was a prizeman in surgery and in clinical medicine. He took the double English diploma in 1888, and the M.B. Cambridge in 1890, served as house surgeon, when post-graduate work in Vienna and Geneva followed. In 1891 he obtained the Swiss Federal Diploma.

At the very commencement of his professional career Foster showed most unmistakable signs of tubercle. He took two long sea voyages, but finally decided that he could not winter in England. This prevented him from seeking any official or hospital preferment in this country, and, after short sojourns at Maloja and Alassio, he proceeded to San Remo, where for many years he practised from November until May, returning to England for the warmer months. He built up a large practice in the Riviera, the outcome alike of sound clinical knowledge and sympathetic comprehension of the physical and mental make-up of a difficult order of patients, and soon attracted professional attention by his knowledge of the effects of climate on disease and by his early advocacy of open-air treatment of tuberculosis. On these subjects he collaborated with Hermann Weber in a contribution to Hale-White's text-book of Therapeutics, while in 1905 he contributed, also jointly with Weber, the section on climate and disease to Allbutt and Rolleston's System of Medicine. In this competent essay were set out the claims of the various climates of the world, and of Europe in particular, for restorative effects in many classes of disease, and the writers close with an exposition of the way to utilise home climates, a subject dear to Foster's heart, since his regard for our own shores was never dimmed by his long sojourns away from them.

Some twenty years ago he embarked upon spa practice in Harrogate, still alternating his residence during the cold months with San Remo. At Harrogate his medical and personal qualities continued to secure him the regard of patients and colleagues alike, but his practice at this period was interrupted by the war. He did good war service. At the outbreak of hostilities he became a temporary officer in the R.A.M.C., being attached to the 2nd Eastern General Hospital with the rank of Captain. Important work here upon cerebro-spinal fever attracted attention, and he was sent to the 55th General Hospital attached to the B.E.F. in 1917, with the rank of Major, while later, with the rank of Colonel, he became consulting physician to the Forces. He was twice mentioned in despatches and created O.B.E. To the Medical History of the War he contributed notes upon the occurrence of cerebro-spinal fever in 1916, in which year he was elected F.R.C.P.

Wherever Michael Foster was he collected practical information upon the treatment of diseases, as influenced by the effect of climate and the technique and amenities of treatment at health resorts. The result was a recently published book entitled the Baths and Medicinal Waters of Britain and Europe, a review of which appeared in our columns a few weeks ago. In this book brief descriptions are given of the different kinds of waters and baths and their uses, while a short survey is included of the principal British and European spas, the information being brought up to the present day. An important lesson to be learned from these pages is that some of the leading spas have begun to make certain courses of therapeutics into a specialty of the place, for it is now recognised that some such classification is needed both in the interests of patients and for the information of doctors.

In his later years Foster was the victim of osteoarthritis, and in 1931 he retired from practice as the result of increasing physical disability. He was the most uncomplaining of invalids, his sweet and charitable temper distinguishing him to the end as it had done throughout his career. He used his leisure to write the useful treatise referred to above, became actively interested in the International Society of Medical Hydrology, and as a member of the advisory committee of the British Health Resorts Association reported on many of the spas in this country despite his increasing lameness.

Foster was twice married. By his first wife, the daughter of Mr. R. Y. Shipley, C.B., he had three sons and one daughter.

HENRY WATSON SMITH, O.B.E., M.D. Aberd.

Dr. Watson Smith, medical director of the Lebanon Hospital for Mental Diseases, died suddenly of angina pectoris on June 12th, when on visit to this country on furlough. During his 25 years of office he had built up at Asfuriyeh, near Beirut, a mental hospital unique of its kind in the Near East. In the absence of any system of certification in Syria he had the chance of receiving many cases in the early stages of mental disorder, and patients travelled to consult him from Egypt, Iraq, Turkey, and Persia.

DR. WATSON SMITH

[Photograph by Abd. Beyrout

Henry Watson Smith was born in 1879 near Aberdeen, the son of a banker, but the influence of his uncle, Dr. C. J. Watson of Heigham Hall Asylum, Norwich, turned his thoughts towards the mental side of medicine. He qualified at Aberdeen with many honours in 1901, and held the usual house appointments, followed by posts of house surgeon at the West Suffolk hospital, and of second assistant officer at the Durham county mental hospital. In February, 1909, he went to Lebanon, having first obtained the Turkish medical degree at Constantinople. Later, he added to French a thorough working knowledge of Arabic.

Apart from his thesis on general paralysis, which gained him the M.D. Aberd. in 1912, Dr. Watson Smith has left little in print. The time that he could spare from clinical and administrative work was given up to teaching medical students at the (American) University of Beirut, where he was appointed professor of psychiatry and neurology in 1926. Regular classes at Beirut and at Asfuriyeh, six miles away, became compulsory for fifth-year students, and he was able to inculcate a grounding of sound mental medicine in men of all nationalities. Any who showed special interest came for a period of two months to work at the hospital and in the attached laboratory. The teaching side of this work was the more important since 35 years ago, when the hospital was founded, any thought or care for mental sufferers in Syria was simply non-existent, beyond the cruel rites of exorcism practised by religious fanatics.

In this result the personality of the director played a great part. His quiet and pleasant ways of dealing with people and affairs won him not only the trust and confidence of his patients and their friends and of the whole staff, but also the respect and goodwill of successive rulers of the country. In the campus of the American University he was a familiar figure, while his attachment to freemasonry brought him into contact with wider groups. He is said to have been the only British subject allowed to remain in Syria during the war, and had it not been for his representations the hill on which the hospital stands would have been used for gun emplacements. As it was, the site was respected by Jemel Pasha as a religious foundation. In 1917, Dr. Watson Smith was able to receive many of General Allenby's men at the hospital during a serious epidemic of influenza in recognition of which he received the O.B.E.

It was perhaps after this time that he began to show his special qualities as an administrator. Out of the meagre funds obtainable for some years from Europe and America, he contrived to restore and re-equip the buildings and develop the 36 acres of land, so that by 1924 the place was ripe for expansion. Pavilion after pavilion was built under his personal supervision, without architect or contractor, including a model steam laundry: an artesian well of 400 feet was successfully bored and a scheme of olive-planting, olive-pressing, and soap-making started. In November last, a new house for women was built entirely out of local funds, helped by capitation fees from the Franco-Syrian authorities for poor patients, and was opened by the president of the Lebanon Republic, who bestowed on Dr. Watson Smith the highest decoration given to a foreigner.

Dr. Watson Smith leaves a widow, and two sons, both of whom are studying medicine at Birmingham.

MEDICAL NEWS

University of Cambridge

At a congregation held on June 8th the honorary degree of master of arts was conferred on Sir Charles Martin, F.R.S., formerly director of the Lister Institute of Preventive Medicine.

Royal College of Surgeons of England

A meeting of the Council was held on June 14th, with Sir Holburt Waring, the president, in the chair. He announced the appointment of Prof. William Wright as Thomas Vicary lecturer for 1934.

The following appointments were made for the primary fellowship examination to be held at Dunedin in December: Prof. W. P. Gowland, assessor in anatomy; Prof. John Malcolm, assessor in physiology; and Mr. Herbert Chapman, superintendent of the examination.

Diplomas of fellowship were granted to the following candidates:—

G. F. Rowbotham, L.R.C.P., Manchester; N. L. Shepperd, M.B. Lond., King's Coll.; R. W. Doyle, M.B. Liverp.; William Buckley, L.R.C.P., Camb. and St. Bart.'s; W. A. Elliston, M.B. Camb., St. Bart.'s; G. K. McKee, L.R.C.P., St. Bart.'s; S. W. Holmes, M.B. Lond., St. Mary's; C. E. Markby, L.R.C.P., Camb. and St. Thomas's; J. K. Stanger, M.B. Durh.; R. J. Furlong, M.B. Lond., St. Thomas's; M. W. C. Oldfield, B.M. Oxon., Leeds; G. T. Partridge, M.B. Camb., St. Bart.'s; E. A. Devenish, M.B. Lond., Univ. Coll.; A. L. Eyre-Brook, M.B. Bristol, St. Bart.'s; R. S. Lewis, L.R.C.P., Camb. and St. George's; H. R. Thompson, M.B. Camb., London; H. F. Moseley, B.M. Oxon., St. Thomas's; H. J. B. Atkins, B.M. Oxon., Guy's; R. G. Pulvertaft, L.R.C.P., Camb. and St. Thomas's; Abbas Hilmy, L.R.C.P., Cairo and Guy's; K. S. Ayyar, L.R.C.P., Guy's and St. Bart.'s; D. B. McGavin, M.B. Camb., St. Bart.'s; J. R. Vald, L.R.C.P., St. Bart.'s; R. D. Ayyar, L.R.C.P., Madras and London; Satyanarayana, Sunkavally, L.R.C.P., Madras and London; F. N. Chenhall, M.B. Sydney; E. J. Collins, M.B. N.U. Irel., Dublin and London; J. V. Guinane, M.B. Sydney, St. Bart.'s; A. I. Hunter, M.B. N.Z., Otago; Sydney Krantz, M.B. Adelaide; J. P. F. Lloyd, M.B. Birm., St. Bart.'s; Andrew Logan, M.B. St. Andrews; C. J. Lord, M.B. Belf., London; S. B. Morris, M.B. N.Z., Otago; D. G. Radcliffe, M.B. Sydney, Otago; and E. B. Whittingham, M.B. Liverp., St. Bart.'s.

Diplomas of membership were granted to A. T. Roden (Bart.'s), H. C. Hugh (Bart.'s), and B. L. E. Wong (Guy's).

At the primary examination for the fellowship, from June 5th to the 16th, 197 candidates presented themselves, of whom 66 were approved and 131 were rejected. The following are the names and medical schools of the *successful candidates*:—

H. Ackers, M.R.C.S. Liverp.; H. Agar, M.B. Leeds, St. Mary's; H. R. Alban, Cardiff; M. Albert, Univ. Coll.; H. G. E. Arthure, M.R.C.S., Middlx.; J. I. M. Black, M.B., Durham; I. N. Blusger, M.R.C.S., Cape and St. Bart.'s; A. Bowen-Davies, M.R.C.S., Camb. and Guy's; W. Bullock, M.B. Liverp.; H. L. Cochrane, M.B. Belf., Univ. Coll.; L. Z. Cosin, M.R.C.S., Guy's; A. G. Cross, M.D. Camb., St. Mary's; H. L. Davies, M.B. Liverp.; I. H. Davies, Cardiff and Middlx.; H. K. Doctor, M.B. Bombay, St. Bart.'s; A. Dornan, M.B. Belf., Middlx.; Katherine W. Dunn-Pattison, Lond. Sch. Medicine for Women; B. H. Ellis, St. Bart.'s; J. S. Ellis, St. Thomas's; F. R. Edwards, M.B. Liverp.; R. H. Franklin, M.B. Lond., King's Coll. and St. Thomas's; S. G. French, M.B. Lond., Univ. Coll. and St. Mary's; H. W. C. Fuller, King's Coll.; Dorothy M. Gladwell, Lond. Sch. Medicine; H. Goldfarb, M.R.C.S., L.R.C.P., M.B. Lond., Univ. Coll.; D. L. Griffiths, M.B. Manch.; E. H. Hambly, St. Bart.'s; A. J. Heriot, King's Coll.; G. Hyman, M.B. Leeds, Middlx.; W. H. G. Jessop, M.B. Camb., Univ. Coll. and St. Mary's; H. H. Langston, M.B. Lond., St. Bart.'s; A. D. Le Vay, Univ. Coll.; J. W. S. H. Lindahl, B.Ch. Camb., St. Thomas's; C. J. Longland, St. Bart.'s; G. H. Macnab, M.B. Edin., King's Coll.; R. L. Mehra, M.B. Punjab, Univ. Coll. and Middlx.;

M. S. M. Mehta, M.B. Bombay, Guy's; D. V. Nadkarni, M.B. Bombay, Middlx.; M. L. Pan, M.B. Calcutta, St. Bart.'s; A. R. Parkes, M.B. Edin., St. Andrew's and Middlx.; E. R. G. Passe, M.R.C.S., London and Middlx.; E. W. Peet, M.B., Durham and Middlx.; G. L. Pett, St. Thomas's; J. W. Pugh, M.B. Oxon., Univ. Coll.; J. L. D. Roberts, St. Bart.'s; A. Rose, M.B. Dubl., Univ. Coll.; H. L. M. Roualle, St. Bart.'s; V. Sankarambal, Madras and Lond. Sch. Medicine; K. C. Sarkar, M.R.C.S. Calcutta, Guy's and King's Coll.; P. G. Scott, M.R.C.S., Camb. and St. Bart.'s; [illegible] nb., London; W. M. H. Shaw, Leeds; F. [illegible] Camb. and St. Bart.'s; J. Sherne, M.B. I [illegible] C. Spencer, M.R.C.S., London; J. A. Stallworthy, M.B. Otago, King's Coll.; R. Strang, M.B. Edin., Guy's; A [illegible] Otago and Univ. Coll.; T. G. [illegible] and Univ. Coll.; R. G. Ta[illegible] Townsley, M.B. Belf., Middlx. [illegible] Middlx.; M. G. Vatsalya, M.R [illegible] R. E. Waterston, M.B. Edin., King's Coll.; W. E. Wimberger, M.B. Birm., King's Coll.; and R. F. Winckworth, M.B. Lond., St. Thomas's.

The following were elected examiners for the ensuing year:—

Dental Surgery.—Surgical Section: Mr. Russell J. Howard, Mr. C. E. Shattock, Mr. C. P. G. Wakeley, Mr. P. H. Mitchiner, Mr [illegible] Vick. [illegible] Mr. J. Basil Hume, Mr. Gr [illegible] Taylor, and Mr. P. N. B. Odgers. Physiology: Prof. G. A. Buckmaster, Dr. D. H. de Souza, Prof. Samson Wright, and Prof. Hamilton Hartridge.

Diplomas of L.R.C.P., M.R.C.S.—Elementary Biology: Mr. T. J. Evans, Mr. G. P. Mudge, Mr. C. C. Hentschel, and Mr. A. J. Grove. Anatomy: Prof. W. E. Le Gros Clark, Prof. H. A. Harris, and Mr. E. P. Stibbe. Physiology: Dr. A. St. G. J. McC. Huggett, and Prof. Samson Wright. Midwifery: Mr. L. Carnac Rivett, Mr. Malcolm Donaldson, Mr. A. C. Palmer, and Mr. V. F. Lack. Pathology: Mr. C. E. Shattock, Mr. Robert Davies-Colley, Dr. R. G. Canti, and Prof. James McIntosh.

Diploma in Public Health.—Part I.: Prof. C. C. Okell. Part II.: Dr. James Fenton.

Diploma in Tropical Medicine and Hygiene.—Major-General D. S. Harvey and Dr. G. Carmichael Low.

Diploma in Ophthalmic Medicine and Surgery.—Part I.: Sir Stewart Duke-Elder and Mr. C. Bernard Goulden. Part II.: Mr. R. Foster Moore.

Diploma in Psychological [illegible] Greenfield.

Diploma in Laryngology [illegible]: Mr. E. Musgrave Woodman and Mr. [illegible]: Mr. T. B. Layton.

Diploma in Gynæcology and Obstetrics.—Mr. J. D. Barris.

Diploma in Medical Radiology.—Part I.: Prof. J. M. Woodburn Morison. Part II.: Dr. J. H. D. Webster.

University of Bristol

At recent examinations the following candidates were successful:—

M.D.

Herbert Rogers (with distinction), F. H. Bodman, J. J. J. Giraldi, and N. L. Price.

CH.M.

G. F. Langley (with distinction).

FINAL EXAMINATION FOR M.B., CH.B.

Part I. (including Forensic Medicine).—M. A. Nicholson and Broughton Ridgway.

Part II.—A. C. Molden (First Class Honours); A. G. W. [illegible] Derham, and C. H. G. Price (Second Class [illegible] Ball, Dorothy E. Barber, Violet Fry, [illegible] L. Gurney, T. R. V. Gurney, Gwladys Mathews.

Society of Medical Officers of Health

The Fever Hospital Medical Services Group of this society will hold their annual general meeting on Friday, June 29th, at 4 P.M., at the house of the society, 1, Upper Montague-street, London, W.C. Prof. Ulrich Friedemann, of the National Institute for Medical Research, who was formerly director of the infectious diseases department of the Rudolph Virchow Hospital, Berlin, will give a paper on malignant diphtheria with observations on cardiovascular failure and methods of treatment.

Conference on Vitamin Standardisation

In connection with the international conference on the standardisation of vitamins, which met in London last week under the auspices of the Health Committee of the League of Nations, Dr. J. O. Wakelin Barratt, the master, the wardens, and the court of assistants of the Worshipful Society of Apothecaries of London held a reception at their hall in Blackfriars on June 14th. Among those who attended the reception were:—

Dr. E. Mellanby, Medical Research Council; Prof. J. C. Drummond, University College; Prof. H. von Euler (Stockholm); Prof. L. S. Fridericia [illegible] B. C. P. Jansen (Amsterdam); Prof. P. [illegible] Dr. E. M. [illegible] (Paris); [illegible] -Gyorgyi [illegible] Geneva); [illegible] d [illegible] reventive [illegible] dingham, Director of the Lister [illegible] Coward, D.Sc.; Prof. A. Jung [illegible] Paris).

On June 13th Dr. W. D. R. Thompson (Inner Temple) and Dr. W. A. M. Stewart (Middle Temple) were called to the Bar.

London Association of Medical Women's Federation

A meeting will be held on Tuesday, June 26th, when Dr. Letitia Fairfield will speak on Eugenic Sterilisation of the Unfit, and Dr. C. P. Blacker will open the discussion. Members are invited to bring guests (men and women).

Hoffman Library for Cancer

Dr. Frederick L. Hoffman, jointly with the Prudential Insurance Company, has presented his library to the Cancer Research Laboratories of the University of Pennsylvania Graduate School of Medicine. The library includes not only a large number of books and reprints and journals on cancer, but also many related works and statistics and mortality data on cancer collected by the donor. Those who wish to deposit books or reprints in the library should address their publications to the Cancer Research Laboratories, University of Pennsylvania Graduate School of Medicine.

Harveian Society of London: the Buckston Browne Dinner

The banquet, offered to the Harveian Society of London annually, and founded by the life president of the Society, Sir Buckston Browne, was held at the Connaught Rooms, London, on Thursday, June 14th, when a large company assembled.

The Greek Minister proposed the health of the Society in fluent and amusing manner. He said that he would be short, and described an episode at a musical party at which he recently was present, when a distinguished composer rendered a composition of his own, which was understood to be a funeral march designed to accompany the transfer of his body from his home to the cemetery. A lady in the audience, finding the composition over-long, remarked, "Dear Maestro, you live too far away from the cemetery." M. Caclamanos said that for this occasion he was living near the cemetery, adding that he could think of only one reason why the toast had been confided to him—namely, that he could read Hippocrates in the original. Yet, he said, he had played once an important medical rôle, for as a young secretary at the Greek legation in Paris he had this singular experience. There was an international sanitary conference in Paris, and the Greek delegate, a distinguished hygienist, having fallen suddenly sick, a peremptory telegram from Athens commanded him to attend the conference as a substitute. "Not only," said his Excellency, "did I represent my Government, but I took part in the discussions, and I signed an important technical convention by which, as far as I can remember, all dreadful diseases were to be expelled from European shores." Proceeding in serious vein, M. Caclamanos declared that always universal admiration would be felt for Harvey; while ancient Greeks had said that there is nothing new under the skies, and while they had discovered so much of the fundamentals of science, they had left it to an Englishman to explain the problem of the circulation of the blood. A part of the story had been guessed by them, and scientists of other nationalities had thrown out views, but, said His Excellency, it was left to your great citizen to really describe the circulation of the blood and to prove his thesis beyond dispute. M. Caclamanos closed by congratulating the Society on entering the second century of its existence.

Sir Buckston Browne, replying to the toast, said that the Society was in a prosperous position, having a membership of 400, while the institution of a prize essay had led to excellent discussions, proving the value of societies, such as the Harveian, in promoting professional intercourse. This, he said, was a truth which the great Harvey himself would have well understood. Darwin, he continued, had changed the whole position of medicine when he showed that the human body was the finest product of evolution, and it was the great duty of the medical profession to keep the machinery of that body in working order.

Mr. Dickson Wright proposed the health of the visitors, to which Dr. F. M. R. Walshe, the Harveian Lecturer, and Mr. F. R. Mortimer, Master of the Worshipful Company of Barbers, responded.

British Homœopathic Society

Dr. O. Leeser, of Stuttgart, is giving an address on "Constitution and Constitutional Treatment" at the London Homœopathic Hospital, Queen-square, W.C., on Thursday, June 28th, at 5.30 P.M., to which all medical men and women are invited.

International Congress of Radiology

The fourth international congress of radiology will be held at Zurich and St. Moritz from July 24th to 31st. Members who wish to avail themselves of any of the special itineraries and inclusive fares arranged are asked to inform the general secretary of the British Institute of Radiology, 32, Welbeck-street, London, W.1, without delay.

Women Smokers in Hospital

Liverpool city council has referred back a recommendation of the hospitals committee that smoking by women patients should not be allowed. It was stated that some women who had been smoking surreptitiously put their cigarettes under the bedclothes when the nurses appeared, with obvious danger of fire. The reference back was carried by a large majority.

Birmingham Skin Hospital

Colonel W. F. Wyley, Provincial Grand Master of Warwickshire, recently laid with masonic rites the foundation-stone of the new in-patient department of the Birmingham and Midland Skin Hospital in George-road, Edgbaston. Last year 80,000 out-patients and over 400 in-patients were treated. When the new building is completed, the old building in John Bright-street will be devoted entirely to out-patient work.

Sanitation at the Hull Airport

The Town Clerk of Hull recently addressed a letter to the Minister of Health asking for extension of the competence of the borough sanitary authority, so as to carry out medical inspection of aliens arriving at the local aerodrome. In his reply, the Minister of Health, while pointing out that the airport lies outside the jurisdiction of the city council and of the port sanitary authority, agrees to extend the present warrants of the medical officers for that purpose.

British Health Resorts Association

A conference is being held by this association at Cromer and Sheringham next week-end, from June 29th to July 1st, with two main subjects for consideration. Dr. R. A. Young, physician to the Middlesex and Brompton Hospitals, will open a discussion on the seaside resort in the treatment of respiratory diseases, other speakers on this theme being Dr. L. S. Burrell and Dr. A. J. Morland. A discussion on the climatic and allied factors in the incidence of disease and its treatment on the East Anglian coast will be opened by Dr. R. Fortescue Fox, followed by Dr. F. W. Burton-Fanning, Dr. Wilfred Pearson, and Mr. L. C. S. Bonacina, of the Royal Meteorological Society. The secretary of the association may be addressed at 199, Piccadilly, London, W.1.

Rockefeller Medical Fellowships

The Medical Research Council announce that, on behalf of the Rockefeller Foundation, they have made the following awards of travelling fellowships for the academic year 1934–35. Ian Aird, M.B. Edin., department of anatomy, University of Edinburgh; Ian Alfred Anderson, B.Sc., M.B. Aberd., Royal Infirmary, Aberdeen; Eric Gordon Oastler, M.B. Glasg., St. Mungo's College, Glasgow; Wilfred Harding Owles, B.Sc., B.M. Oxon., Queen's Hospital, Birmingham; Harold Leeming Sheehan, M.Sc., M.D. Manch., department of pathology, University of Manchester; and Clifford Wilson, B.M. Oxon., department of pathology, London Hospital. These fellowships are awarded to graduates who have had some training in research work either in the primary sciences of medicine, or in clinical medicine or surgery, and who are likely to profit by a period of work abroad before taking up positions for higher teaching or research in the British Isles. All the fellows appointed this year will work at centres in the United States.

Epsom College

The following Foundationers were elected by the conjoint committee on June 13th: Daniel L. C. Thomas, William Farquhar Graham, John Urquhart Crichton, Colin C. R. Walker, Francis McLean Mathewson, Ian Young, and Donald M. Simmins. Denis M. W. Hartley was also elected as a special Foundationer. The following were elected Pensioners: Mrs. Grace Elizabeth Hutchinson and Mrs. Alice M. A. Cockell.

Brentwood District Hospital

This new hospital was opened last week by Princess Helena Victoria. A site of 18 acres was given by Mr. Percy Bayman, and the building has cost £40,000, the whole of which has been subscribed. It was designed to provide 100 beds; at present there are 40.

East Suffolk and Ipswich Hospital

Lord Moynihan last week opened a new block of private wards containing 30 single-bed wards and 4 six- or four-bed wards. In his speech Lord Moynihan emphasised the fact that the income of the voluntary hospitals of the country now exceeded their expenditure.

Putney Hospital for Incurables

At the festival dinner last week of the Royal Hospital and Home for Incurables, Putney, it was stated that the institution has 250 inmates, and a pension list of 600. The cost of maintenance and pensions is £40,000 per annum. Owing to an abnormal number of bequests the year 1933 was "extraordinarily good."

Royal Salop Infirmary

The annual report states that last year there were 2080 in-patients, a small increase, and 9257 out-patients, an increase of nearly 800. The facilities for treating surgical cases are rapidly becoming inadequate, and the one general theatre has been in use for practically a 24-hour day throughout the year.

Lady Tata Memorial Scholarships

The trustees of the Lady Tata Memorial Trust announce that on the recommendation of the scientific advisory committee, they have made their awards of scholarships for the year 1934–35. These scholarships were open to graduates of any nationality for research work in diseases of the blood, with special reference to leukæmia. The recipients are: Dr. W. Büngeler (Danzig), Dr. L. Doljanski (Copenhagen), Dr. M. C. G. Israels (Manchester), Dr. C. Oberling (Paris). Dr. J. Engelbreth-Holm (Copenhagen), Dr. M. O. K. Jorgensen (Aarhus, Jutland, Denmark), Dr. R. Meier (Leipzig), and Dr. Lucy Wills (London).

Pay-Beds at London Hospital

At the quarterly court of the governors of the London Hospital last week the house committee reported that King Edward's Fund had approved of the proposal to establish pay-beds for patients of moderate means. The scheme involves the adaptation of the three top floors of the block in Newark-street, but by putting into use rooms elsewhere, hitherto unoccupied, and by various readjustments the number of beds available for the poor will not be diminished to any appreciable extent. The scheme will provide 44 beds and cubicles; the charges will be moderate, and as far as possible inclusive, and the specialists' fees will be reduced to meet the patient's circumstances. The cost of adaptation and of building an operating theatre will be about £10,000, and since the general hospital funds cannot be used for the purpose an appeal for this sum is to be issued.

A REPUDIATION.—Dr. A. J. Byrne asks us to say that he gave no consent to the publication of a recent paragraph in the *Guardian*, communicated by a patient and expressing her appreciation of his treatment. He is advised by the Medical Defence Union to ask publicity for this repudiation.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

Hospitals and Treatment of Road Accidents

WHEN the Road Traffic Bill was further considered by a Standing Committee of the House of Commons on June 14th. Mr. STOREY moved a new clause providing for the payment for hospital treatment of road accidents other than emergency treatment up to a maximum of £50 for in-patients and £5 for out-patients, irrespective of the question of negligence.

A REASONED PLEA FOR COMPENSATION

It was, said Mr. Storey, the logical conclusion of the emergency treatment clause already passed. If it was right to pay for emergency treatment given by hospitals, then it was even more right that treatment which might cost the hospitals tens and even hundreds of pounds should be met in this way.

It might, he said, be objected that this clause and the emergency treatment clause attributed the whole fault of accidents to the motorists. He submitted that they did nothing of the sort. Accidents were not due to the fault of motorists but to the fact that there were motors on the roads. This clause provided that the cost of treatment due to the fact of motors should be borne not by the hospital or the patient, who were not responsible for the change in conditions, but by the motorist who was responsible for the change. It did, however, give to the motorist, where it could be proved that some other party was directly responsible for the accident, the right of recovery. The compulsory insurance clauses of the Road Traffic Acts provided a means by which the cost of such treatment could be met without any appreciable burden on individual motorists; they provided a means by which payment for that treatment could be distributed among the hospitals rendering the treatment and they might also provide the means by which these matters could be handled by those who were most experienced in dealing with them.

Road accidents cost the hospitals some £180,000 per annum. With the limit of £50 proposed in this clause the amount recovered would not amount to anything like that sum, but even if the whole cost were recovered, it would work out at only 1s. 7*d*. per head to the motorists. That was a very small contribution to ask from motorists to the hospitals. He did not believe after a good deal of experience in collecting money for hospitals that if these provisions were passed hospitals would lose a penny piece in subscriptions.

Not only among the hospitals, but among the subscribers, particularly the workmen subscribers, there was at present a real feeling of hardship. They said that the money raised by them to treat the sick in their district was being used to treat road accident cases, the cost of which they held should be met from other sources. Under the 1933 Act something was done for the hospitals, but it was very little. Representatives of the hospitals had put forward their solution, and if the Minister would not accept it, would he suggest an alternative?

Sir FRANCIS FREMANTLE said what most of his friends were keen on was to get this hardship to the voluntary hospitals put right. There was a strong feeling on this subject throughout the country which had resulted in this clause. He hoped that the Minister of Transport would show that if he had not an alternative ready to hand he was prepared to help representatives of the hospitals to find a solution.

Sir ERNEST GRAHAM-LITTLE said the request for this clause came from all the authoritative bodies which dealt with hospitals. What the hospitals undertook was not merely emergency treatment. It was the specially difficult and important cases that went to the hospitals which entailed in the great majority of cases a long period of treatment.

THE MINISTER'S REPLY

Mr. OLIVER STANLEY objected to putting the motor owner in a selected position as almost the only class in the country to be responsible for an act which was not in any way negligent and which indeed might be caused by the negligence of someone else. He wondered whether the clause was really in the best interests of the hospitals themselves. He dismissed at once as, taking the hospitals as a whole, grossly unfair the argument that motors had created this new situation, that it was the coming of the motor which had put this responsibility upon hospitals, and therefore it must be the motor owner who paid. They could not take that sort of debit side of the invention of the internal combustion engine without looking at the credit side also. He felt that to the ordinary subscribers to hospitals, such as himself, this meant the end of the voluntary hospital system as he had always understood it. It was now proposed that they should adopt a new principle and that they should be taxed—for that was what it amounted to—to provide for the care of certain unfortunate injured people if their injury arose in a special way. He thought that such an idea would lead many subscribers to hospitals in the future to limit their subscriptions to hospitals to whatever return those institutions might give to them. Had there ever been an attempt by the hospitals as a whole to try with the help of motoring organisations and motorists generally to set up a central fund from which relief could be given? [Mr. TURTON said that had been done in Yorkshire.] He believed that not only would the immediate result of such an appeal be better from the point of view of the hospitals, but that taking the long view their future would be much more assured.

Mr. STOREY said that the alternative offered, a corporate appeal to motorists, had already been tried and had not proved particularly successful. He had no reason to think that a general appeal all over the country would be any more successful. He appealed to the Minister to try to get the motorists, insurance companies, and the hospitals together.

Mr. STANLEY said he gladly responded to this suggestion.

The clause was negatived by 21 votes to 6, and this concluded the committee stage of the Bill.

HOUSE OF COMMONS

WEDNESDAY, JUNE 13TH

Naval Cadets and Defective Vision

Mr. SAVERY asked the First Lord of the Admiralty the number of cadets who, during the last three years, had been compelled to withdraw from Dartmouth Naval College on account of defective vision.—Sir BOLTON EYRES-MONSELL replied: During the last three years seven cadets have been required to withdraw from the Royal Naval College, Dartmouth, on account of defects of vision. Of these, one had been offered a transfer to the engineering branch and five to the accountant branch, but these transfers had been declined. The seventh was unfit for service in any branch.

Blackheath Hospitals and Electric Light Failure

Mr. THORNE asked the Minister of Transport whether he had received a report from his inspectors relative to the inconvenience caused to the hospitals in the Blackheath area when the electric light supply failed for a number of hours on Sunday night; if he was aware that the hospitals had no electric light supply for three hours; and if he could state the cause of the breakdown.—Mr. STANLEY replied: I am informed that the breakdown was due to a fault on an old distributor which had been in service for many years; that the principal inconvenience was suffered by the Herbert Hospital; and that the hospital has now been connected to a new ring main which the company were laying to provide additional security of supply and which was on the point of completion when the breakdown occurred.

Cheap Milk-supplies in Glasgow

Mr. KIRKWOOD asked the Secretary of State for Scotland what contract was signed by the Glasgow milk retailers who had been refused supplies by the Milk Board because they sold standard milk to working-class consumers at cheap rates; and, if no contracts were signed by these retailers, why were they prohibited from selling milk at the lowest possible price to consumers.—Sir GODFREY COLLINS replied: Under the contract entered into between distributors and the Scottish Milk Marketing Board it is provided that all buyers of milk from or through the agency of the Board shall undertake to observe the prices fixed by the Board and to take subpurchasers bound in a similar obligation. The retailers referred to are subpurchasers in terms of the contract.

Malaria in Bechuanaland

Mr. LUNN asked the Secretary of State for Dominion Affairs whether he could give any information on the outbreak of malaria in Bechuanaland; whether he was aware that at Ghanzi there had been 250 deaths following a period of starvation; and what measures His Majesty's Government was taking.—Mr. THOMAS replied: I regret to say that there has been an outbreak of malaria in certain districts of the Bechuanaland Protectorate. I have not yet received any detailed reports from the High Commissioner for South Africa as to mortality, but I have no doubt that these will be forthcoming as soon as the information is available. Prompt measures have been taken by the local administration to deal with the outbreak by sending medical officers and the necessary supplies of quinine to the districts affected. I may add that provision was made last year and has again been made this year for the relief of distress unfortunately occasioned in the Protectorate by the late disastrous drought in South Africa.

Butter and Margarine in Pensions Hospitals

Mr. HAMER RUSSELL asked the Minister of Pensions if he was aware that margarine was issued normally to all patients in the Ministry of Pensions hospitals; and if, having regard to the surplus milk in the country, he would issue instructions for butter to be used in place of margarine.—Major TRYON replied: Butter is always supplied to patients in Ministry hospitals if medically recommended, but otherwise the practice in Ministry hospitals has in the past followed that of the majority of similar institutions. But I am going into this matter with a view to making a change.

Mr. MACQUISTEN: Is the Minister aware that certain qualities of margarine have the same qualities as cod-liver oil and are much better for patients than ordinary butter?

No answer was given.

THURSDAY, JUNE 14TH

Silicosis

Mr. JOHN asked the Home Secretary whether he had received a reply from the Mining Association on the subject of silicosis; and whether he was now in a position to review the arrangements in force under the present scheme.—Sir JOHN GILMOUR replied: As the result of the conferences which have recently taken place, I am expecting to receive next week from the Mining Association certain proposals which they desire to submit with a view to remedying the position. I should then be able to review the existing arrangements, and the hon. Member may be assured that every effort will be made to reach an early decision.

Imported Milk Products and Public Health

Lieut.-Colonel WINDSOR-CLIVE asked the Minister of Health what precautions he was taking to ensure that all dairy products imported into this country were produced under the same sanitary conditions as were imposed on similar products produced here.—Sir HILTON YOUNG replied: Imported milk is subject to special bacteriological conditions which do not apply to home-produced milk. In addition all imported articles of food are subject to examination at the port of entry to ensure that they are not diseased or otherwise unfit for human consumption.

Nursery Schools

Viscountess ASTOR asked the Parliamentary Secretary to the Board of Education what local education authorities submitted plans for new nursery schools during 1931; and which of these were refused by the Board of Education on account of the economy cuts.—Mr. HERWALD RAMSBOTHAM replied: Eleven local education authorities submitted proposals for new nursery schools during 1931. In the case of seven of these approval of the proposal was withheld on account of the financial circumstances, but one has since been allowed to proceed.

Viscountess ASTOR: Would the hon. gentleman promise the House that now the financial circumstances are better he will give the local authorities permission to establish these schools?

Mr. RAMSBOTHAM: That must depend on the urgency of the circumstances.

Underground Rooms in London

Major NATHAN asked the Minister of Health whether he had now obtained any particulars from the London County Council as to the number of underground rooms habitually used as sleeping places in the administrative County of London that were unfit for human habitation within the meaning of Section 18 of the Housing Act, 1925.—Sir HILTON YOUNG replied: Yes, sir. I understand that the returns being obtained by the London County Council are still incomplete, but those received up to date show 7186 rooms within the description used by the hon. Member.

Water-supplies in Scotland

Lord SCONE asked the Secretary of State for Scotland the present position in regard to the shortage of water in Scotland in general and in the counties of Perth and Dumfries in particular.—Mr. SKELTON (Under-Secretary of State for Scotland) replied: No reports of the existence of any special emergency arising from a shortage of water due to drought have been received from any local authority. The information of the Department of Health is that, thanks to the rains this spring, the areas that suffered a shortage in the spring and autumn of last year are at the present moment adequately supplied. It is known, however, that supplies in certain localities are under ordinary conditions inadequate and the department are at present receiving from local authorities applications for grant under the Rural Water Supplies Act, 1934, to assist in providing supplies or in improving existing supplies.

MONDAY, JUNE 18TH

Veterinary Inspection of Cattle

Mr. THOMAS WILLIAMS asked the Minister of Agriculture how many qualified veterinary surgeons were employed by his department exclusively for inspecting cattle, and farm sheds and buildings, and other duties involved in the Tuberculosis Order, 1925; and how many inspections were carried out during the last year for which figures were available.—Mr. ELLIOT replied: There are no qualified veterinary surgeons employed by the Ministry exclusively on duties involved under the Tuberculosis Order, 1925, which, in the main, is administered by the local authorities and their veterinary staffs. Imported cattle are examined in the landing place by the Ministry's veterinary staff for tuberculosis as well as for other scheduled contagious diseases, and on this work 11 veterinary inspectors are employed full time.

Gas Attack Lectures in Scotland

Mr. KIRKWOOD asked the Secretary of State for Scotland under what authority Army officers had been giving private lectures in Maryhill Barracks, Glasgow, to members of the Red Cross and Voluntary Aid Detachment on how to deal with victims of gas attacks from the air; if similar lectures were being given in other parts of Scotland; and, if so, were these part of an official scheme to prepare for war in the air.—Mr. DUFF COOPER (Financial Secretary to the War Office) replied: Training in defence measures against gas attacks, whether from the air or otherwise, is part of the normal training of the Army. The Voluntary Aid Detachments provided by the British Red Cross Society undertake to assist the medical services of the Army should they be required in time of emergency, and measures of protection in gas warfare form part of the training given to these detachments. Army officers are accordingly allowed to assist this training by giving lectures.

Safety Glass in Taxi-cabs

Sir ASSHETON POWNALL asked the Home Secretary if he would make the use of safety glass obligatory for all taximeter-cabs licensed in future.—Sir J. GILMOUR replied:

The requirement as to the fitting of safety glass is the same for taxicabs as for other motor vehicles—namely, that vehicles registered after Jan. 1st, 1932, must have safety glass fitted to windscreens or windows facing to the front on the outside, and that vehicles registered before that date must be so fitted before Jan. 1st, 1937. *It is not proposed at the moment to make any additional requirements for cabs.* Most of the new cabs presented for licensing in London are, however, fitted with safety glass throughout.

TUESDAY, JUNE 19TH

Gas Detectors in Mines

Mr. TOM SMITH asked the Secretary for Mines if he could make a statement with regard to the suggested regulation for the compulsory use of gas detectors underground.—Mr. E. BROWN replied : It is an essential condition of effective action in this matter that the workmen individually and through their organisations shall coöperate willingly and actively to give effect to any regulations that may be made. Otherwise the regulations would be ineffective. The reasons why this is so were fully stated in the unanimous report made some years ago by a representative committee—the Miners' Lamp Committee—and they are reasons which hold good to-day. In these *circumstances it is of the first importance that I should, if* possible, find a basis of action by agreement with the workers' representatives, and I propose to invite them to a further discussion of the objections they now feel to the proposals put forward by me.

Collections for Charities

Mr. OSWALD LEWIS asked the Home Secretary if he had yet come to a decision as to whether there was any action that he could usefully take for the better control of house-to-house collections and collections in such places as shop arcades and railway stations for charitable purposes in the Metropolitan police district; and, in particular, whether he would make it obligatory for all persons taking part in such collections to have a permit from the police as recommended int the Report of the Advisory Committee on Street Collections for 1933.—Sir J. GILMOUR replied : Since my hon. friend asked me a question on the same subject in April, I have given the matter my careful consideration. As he is probably aware, the Departmental Committee on the Supervision of Charities, which reported in March, 1927, recommended, among other things, that a system of licensing for door-to-door collections should be introduced, and this proposal was included in the Collecting Charities (Regulation) Bill which was introduced by the Government in 1929. This particular proposal, however, met with great opposition and the Bill was not proceeded with. In the absence of any reason to suppose that there has been a material change of feeling, I do not see my way to introduce fresh legislation for the purpose, and in any case there would be no opportunity for legislation this session.

Vacancies

For further information refer to the advertisement columns

Aberdeen University.—Lecturer in Morbid Anatomy. £400.

Accrington Victoria Hospital.—H.S. £150.

Birmingham Children's Hospital.—Res. M.O. £175.

Birmingham City.—P.H. Dept., Sen. Asst. M.O. for Tuberculosis Section. £750.

Birmingham City Education Committee.—Temporary Asst. School M.O. At rate of £500.

Bolton Royal Infirmary.—H.P. £200.

Brentwood, Essex, Highwood Hospital.—H.P. At rate of £80.

Bristol Eye Hospital.—Asst. Res. H.S. At rate of £100.

Cardiff, University College of South Wales and Monmouthshire.—Asst. Lecturer in Anatomy. £400. Asst. Lecturer in Physiology. £400. Asst. Lecturer in Histology. £300.

Central London Ophthalmic Hospital, Judd-street, W.C.—Sen. and Jun. H.S.'s. £120 and £100 respectively.

Central London Throat, Nose, and Ear Hospital, Gray's Inn-road, W.C.—Hon. Assts. for Out-patients' Dept.

Chesterfield and North Derbyshire Royal Hospital.—H.S. At rate of £150.

Connaught Hospital, Walthamstow, E.—H.P. At rate of £100.

Dagenham Urban District Council.—M.O.H. £900.

Dublin, Ministry of Pensions Hospital, Leopardstown Park.—Asst. M.O. At rate of £285.

Durham County Hospital.—Two H.S.'s. Each £150.

East Ham Memorial Hospital, Shrewsbury-road, E.—Hon. Ophth. Surgeon.

Exeter, Royal Devon and Exeter Hospital.—H.S., Ear, Nose and Throat Dept. At rate of £150.

Folkestone Royal Victoria Hospital.—Sen. and Jun. Res. M.O.'s. At rate of £150 and £120 respectively.

Gloucestershire Royal Infirmary, &c.—H.P. and H.S. Each at rate of £150.

Guildford, Royal Surrey County Hospital.—H.S. £150.

Hospital for Consumption and Diseases of the Chest, Brompton, S.W.—H.P. At rate of £50.

Hospital for Sick Children, Great Ormond-street, W.C.—H.S. At rate of £100.

Huddersfield Royal Infirmary.—H.S. At rate of £150.

Hull Royal Infirmary.—Third H.S. At rate of £150. Hon. Radiologist. Also Cas. O. At rate of £150.

Ilford, King George Hospital.—Cas. O. and H.S. At rate of £130 and £1[illegible]

Indian Me[illegible]

King's Col[illegible] *S.E.*—Hon. Radiologist.

Lincoln Co[illegible] At rate of £150.

Liverpool, [illegible] -Res. Asst. M.O. £200.

London Lock Hospital, 91, Dean-street, W.—Surg. Reg. £100.

London (R.F.H.) School of Medicine for Women, Hunter-street, W.C.—A. M. Bird Post-grad. Scholarship. £200.

London University.—Examinerships.

Maidstone, West Kent General Hospital.—H.P. £150.

Manchester Hospital for Consumption and Diseases of the Throat and Chest.—Res. M.O. for St. Anne's Home. £200.

Manchester Northern Hospital for Women and Children, Park-place.—Jun. H.S. £100.

Manchester Royal Children's Hospital.—Res. M.O. At rate of £125.

Manchester Royal Eye Hospital.—Jun. H.S. £120.

Metropolitan Hospital, Kingsland-road, E.—Cas. O. At rate of £100.

Middlesex County Council.—Tuberculosis M.O. £750.

Miller General Hospital, Greenwich-road, S.E.—Cas. O. At rate of £150.

National Temperance Hospital, Hampstead, N.W.—Hon. Asst. Surgeon.

Newcastle-upon-Tyne Hospital for Sick Children.—Res. Surg. O. £250.

New Zealand, Wellington Hospital Board.—Superintendent. £1100. Also Res. Surg. O. £400

Norwich, Norfolk and Norwich Hospital.—H.S. to Spec. Depts. £120.

Nottingham Children's Hospital.—Res. H.S. At rate of £150.

Rochester, St. Bartholomew's Hospital.—H.S. At rate of £175.

Royal College of Surgeons of England.—Pathological Curator of the Museum.

Royal London Ophthalmic Hospital, City-road, E.C.—Refraction Asst. to L.C.C. School Dept. £160.

St. Alfege's Hospital, Vanbrugh Hill, Greenwich, S.E.—Asst. M.O. £350.

St. Bartholomew's Hospital, E.C.—Chief Asst. to X Ray Diagnostic Dept.

St. Charles' Hospital, Ladbroke-grove, W.—Asst. M.O. £250.

Salisbury General Infirmary.—H.S. and H.P. Cas. O. Each at rate of £125.

Scarborough Hospital and Dispensary.—H.S. At rate of £175.

Sheffield Children's Hospital.—H.S. Also H.P. Each at rate of £100.

Sheffield Royal Infirmary.—M.O. to Assist Medical Director at Sheffield Radium Centre.

Singapore, Straits Settlement, King Edward VII. College of Medicine.—Prof. of Surgery. £1190.

Southampton, Free Eye Hospital.—Locum Tenens Ophth. S.H. Six gns. per week.

Southampton, Royal South Hants and Southampton Hospital.—Sen. H.S. £200.

Southend Municipal Hospital, Rochford.—Asst. M.O. £275.

Southend-on-Sea General Hospital.—H.S. At rate of £100.

Stockport Infirmary.—H.S. £150.

Surrey County Mental Hospital Service.—Jun. Asst. M.O. £350.

Tunbridge Wells, New Kent and Sussex Hospital.—Res. Surg. O. £250. Sen. H.S. £175. Second H.S. £150. Also Jun. H.S. £125.

Willesden Corporation, Health Dept.—Dental Surgeon. £600.

Wolverhampton Royal Hospital.—H.P. At rate of £125. Also Asst. Res. M.O. and H.S. to Spec. Depts. Each at rate of £100.

Woolwich and District War Memorial Hospital, Shooter's Hill, S.E.—H.P. and H.S. Each at rate of £100.

The Chief Inspector of Factories announces a vacant appointment for a Certifying Factory Surgeon at East Kilbride, Lanark.

Appointments

ANDERSON [illegible] M.R.C.S. Eng., [illegible] Glasgow Royal [illegible] hemistry to the University of Glasgow.

ARTHURE, H. J. E., M.B., B.S. Lond., House Surgeon at the Chelsea Hospital for Women.

GRAHAM BRYCE, A., M.D. Manch., F.R.C.S. Eng., Honorary Assistant Surgeon to the Manchester Royal Infirmary.

MARTIN, J. PURDON, M.D., F.R.C.P., Honorary Assistant Physician to the Royal London Ophthalmic Hospital (Moorfields Eye Hospital).

MOIR, P. J., M.C., M.B. Glasg., F.R.C.S. Eng., Hon. Surgeon to the General Infirmary, Leeds.

O'REILLY, J. N., B.M. Oxon., M.R.C.P. Lond., Hon. Physician to the Royal Waterloo Hospital for Children and Women.

SMITH, R. R., L.R.C.P. Lond., M.R.C.S., Medical Referee under the Workmen's Compensation Act for Birkenhead, &c. (Circuit 7).

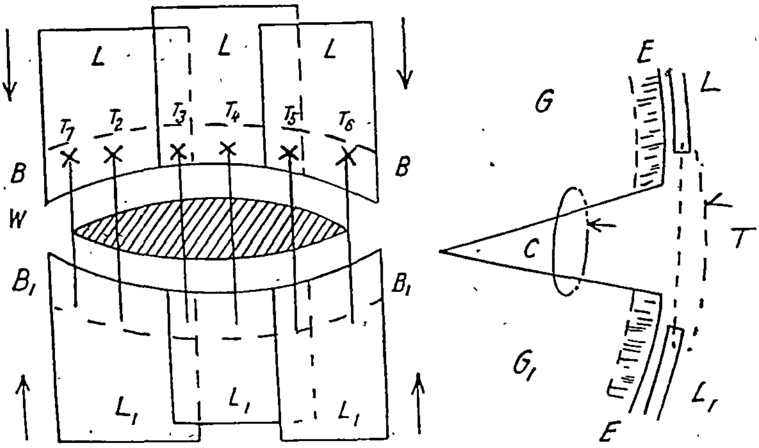
TURNER, Beatrice, M.B. Lond., F.R.C.S. Edin., Junior Obstetric Surgeon to the Elizabeth Garrett Anderson Hospital.

NOTES, COMMENTS, AND ABSTRACTS

CUTANEOUS WOUNDS JOINED WITHOUT SUTURE

To obviate the disadvantage, in joining the edges of a wound, of making a series of new puncture wounds for the passage of the threads, Dr. **Ejnar Dujardin**, of Copenhagen, proposes the following method, which he has practised successfully.

At a distance of about 1 cm. from the edges of the wound (W) slips of adhesive plaster (L–L_1) are attached to the skin, their borders being shaped according to the shape of the wound. A narrow border (B–B_1) of the plaster strips is left unattached to the skin, and through these free borders silk threads (T_1–T_6) are sewn from slip (L) to slip (L_1). The borders are then stuck together (B to B_1) and on tightening and knotting the threads the wound edges are carefully approximated. Care must be taken that the adhesive plaster slips are placed in such a way that the pull is longitudinal and not transverse. If the wound is particularly deep the tension may be reduced by applying through the subcutaneous tissue (G–G_1) ring-shaped countersunk catgut sutures (C) which do not touch the epidermis (E) and which are tightened and knotted before sticking the adhesive plaster slips together. Dr. Dujardin says that this method, apart from the good result from a cosmetic point of view, has the advantage of being painless.



Diagrams illustrating the closure of wounds without suture by Dr. Dujardin's method.

LEPERS IN MALAYA

Every leper in Malaya is required by law to be segregated, and this law is strictly enforced. With the object of providing model conditions of housing, control, and treatment, the Government of the Federated Malay States opened in 1930 a free leper settlement at Sungei Buloh, 12 miles north-east of Kuala Lumpur, an account[1] of which has been prepared for publication by Dr. G. A. Ryrie, the medical superintendent. The settlement, which covers 57 acres, has accommodation for about 1000 lepers, who are housed in 13 large wards and some 150 separate dwelling houses. There is a school for 80 children, hospital wards are provided for advanced cases and for the sick, and out-patient buildings for examination and treatment of ambulatory inmates. All patients, except a few patently beyond aid, receive regular treatment, and they are encouraged to look forward to ultimate discharge, which is permitted when they have been clinically and bacteriologically free from symptoms for six months. Dietetic, biochemical, and serological experiments, and investigation into the action of new drugs, are carried out with the aid of two volunteer groups kept under ward supervision.

An interesting feature of the settlement is the endeavour to control the lepers without any coercion, physical or mental. Dr. Ryrie says: "The settlement is not on an island; there is no wall—only a demarcating wire fence—and any of these legally detained patients could escape if they wanted to. There are no outside guards or police, and the settlement is only a mile from the main road to the capital. In spite of this, very few ever attempt to escape, and most of these return voluntarily in a short time." This is effected by giving the patients responsibility and a share in the management of the institution, by providing them with plenty of suitable occupation and recreation, and by surrounding them with an atmosphere of fairness and naturalness. Four shops managed by the inmates are subject to only two restrictions—that no opium or alcohol is on sale, and that nothing but metal money, which can be easily sterilised, may pass as currency.

Married quarters are supplied in each section. The birth-rate is low, and, as no child is ever born with leprosy, those born in the settlement are protected by being removed at the age of two weeks to the general hospital in Kuala Lumpur, where they are cared for at Government expense. When parents are discharged from the settlement their children are returned to them; others are adopted. The work of the settlement is undoubtedly an advance in international endeavour to secure suitable conditions and adequate treatment for lepers, and when it is realised that the patients are of many different nationalities and at least half a dozen religions, it says much for the methods employed that administrative trouble is avoided and that a courteous and cheerful atmosphere prevails.

TRAINED NURSES FOR PATIENTS OF SMALL MEANS

The chairman of committee of the Nursing Sisters' Institution, 10, Collingham-road, London, S.W.5, calls our attention to the facilities provided by this institution. It was founded by Mrs. Elizabeth Fry, in 1840, for providing fully trained nurses at a reduced fee for those of small means. All members of the staff are fully trained State-registered nurses and are fully competent to undertake the nursing of all acute cases of illness: those sent to maternity patients hold, in addition to their certificate for general training, the certificate of the C.M.B. The fees charged are from £2 12*s.* 6*d.* per week, and a billeting fee of £1 1*s.* to £1 10*s.* is charged for boarding out nurses who cannot be accommodated in the patient's home. Our readers will be glad to have the address of the institution for the benefit of patients unable to afford the full fees for the services of a private nurse. Further particulars may be obtained from the lady superintendent at the institution.

LONDON OUT-PATIENT TIME-TABLE

King Edward's Hospital Fund has brought out a new edition, revised to May, 1934, of a hospital out-patient time-table, setting out the hours at which medical, surgical, and other special cases are dealt with at the voluntary hospitals within the radius of 11 miles from St. Paul's. The time-table should be of assistance not only to the various social agencies, which often make the actual arrangements for attendance, but especially to the general practitioners who may wish to send their patients for consultations. The information should help to prevent the fruitless waiting which occurs when patients attend out-patient departments at the wrong hour or even on the wrong day. The time-table, which can either be kept folded as an octavo booklet or unfolded in quarto form and inserted in a telephone directory, may be obtained free of charge from Messrs. Geo. Barber and Son, Ltd., Furnival-street, E.C.4.

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[1] The Leper Settlement at Sungei Buloh in the Federated Malay States. Printed for the Government by the Malaya Publishing House Limited, Singapore, 1933.

HEALTH IN PREGNANCY

Nobody is more avid of good advice than the expectant mother, and nobody receives more of it, verbally from her next-door neighbour, and in print from the daily press. Since teaching from such a reliable source as the head of a unit of obstetric medicine in the University of London enters the lists at the competitive price of only 6*d.*[1] there is no excuse for not consulting him in preference to daily or weekly soothsayers. At the best, however, advising the expectant mother is a somewhat delicate process. The interest she is bound to take in herself has to be guided without undue foreboding and without undue heartiness. She has to be assured that pregnancy is a natural condition and to realise that it is at the same time a period of strain. Prof. Browne achieves a nice balance. His advice is brief and practical. He deals in short paragraphs with the signs of pregnancy, its common disorders and their treatment, with preparations for confinement and with the breast-feeding and care of the baby. The chapter on the disorders of pregnancy is particularly useful, as it clearly distinguishes the normal from the abnormal and indicates when the doctor should be called in. This is important from the point of view of welfare of the patient, as when a woman has formed the habit of putting up with a lot it is quite possible for her to put up with too much. Dr. Browne is perhaps a little gloomy about constipation, which bulks large on the modern horizon in ordinary life and in pregnancy overhangs the whole sky. In all other respects this is an excellent little book.

THE DANGER OF POLISHED FLOORS

The question of suitable flooring material for the wards of hospitals recently exercised the minds of an important hospital congress,[2] and was left largely in the air. In the meantime polished wood blocks continue to claim their victims. A week or two ago Mr. E. W. Norris, coroner for Huddersfield, held an inquest upon a man of 75, a patient in St. Luke's Hospital, who had a fall in the ward and fractured a wrist when he got out of bed in the temporary absence of the nurse. Death was due to myocarditis, brought on by chronic bronchitis, accelerated by the injury to the wrist, and the coroner said he could never understand why floors in hospitals where there were old and infirm patients should be highly polished. He understood that the patients at the hospital were given slippers with leather soles, but these were a poor protection against slipping on a polished surface. Surely, he added, if the floors were well scrubbed the same clean appearance would be obtained as by polishing.

THE HOSPITAL AND THE "DOGS"

In the *Harrap Mercury* for June, issued gratis by George Harrap and Co., Ltd., the well-known publishers, is the following paragraph:

"The crying need for an up-to-date English-French dictionary was forcibly brought home to me recently. In a very well-known dictionary, widely used in schools, I found under the French word *hôpital* the following English equivalents: 'hospital, almshouse, *dogs*.' Dogs? I racked my brain—and the astonishing solution suddenly dawned on me. The English equivalent of the French expression *aller à l'hôpital* is 'to go to the dogs': the compiler of the dictionary had arrived at the momentous conclusion '*hôpital*=dogs' by the simple process of cancellation!"

We should add that Spiers in his dictionary stated that "to go to the dogs" is "*prendre le chemin de l'hôpital*," and Larousse states that "*réduire à l'hôpital*" means "*ruiner*."

Small-pox—Then and Now.—Dr. R. L. Wason writes: "In the ancient church of St. Pancras, Exeter, is a tablet to the memory of a Cornish girl who died in the year 1711 'of the smallpoxe, a distemper so remarkably fatall to her family that no fewer than foure of her sisters perished of it during the months of February and March 1716 in the burroughs of Penryn and Fowy in the County of Cornwall aforesaid.'"

Medical Diary

SOCIETIES

EUGENICS SOCIETY.
Tuesday, June 26th.—5.15 p.m. (at the Linnean Society, Burlington House, Piccadilly, W.), Prof. F. A. E. Crew: The Inheritance of Educability in the Rat.

ST. JOHN'S HOSPITAL DERMATOLOGICAL SOCIETY, 49, Leicester-square, W.C.
Wednesday, June 27th.—5 p.m. (at the Royal Society of Medicine), Dr. William A. Pusey (Chicago): Disease, Gadfly of the Mind, Especially the Stimulus of Disease in the Development of the Mind. (Prosser White Oration.)

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
Monday, June 25th, to Sunday, July 1st.—Prince of Wales's Hospital, Tottenham, N. All-day Course in Medicine, Surgery, and the Specialties.—National Hospital for Diseases of the Heart, Westmoreland-street, W. All-day Course in Cardiology. (Open to non-members.)—Children's Clinic, 48, Cosway-street, Marylebone-road, N.W. Course in Children's Diseases.—Metropolitan Hospital, Kingsland-road, E. Week-end Course in Medicine and Surgery. All-day, Sat. and Sun.—Medical Society of London, 11, Chandos-street, Cavendish-square, W. Lecture-demonstration by Dr. A. E. Clark-Kennedy on Nephritis, Tues., at 2.30 p.m.—Panel of Teachers. Individual Clinics in various branches of medicine and surgery are available daily by arrangement with the Fellowship of Medicine. Courses of instruction, clinics, &c., arranged by the Fellowship of Medicine are open only to Members and Associates, unless otherwise stated.

HOSPITAL FOR EPILEPSY AND PARALYSIS, Maida Vale, W.
Thursday, June 28th.—3 p.m., Dr. F. L. Golla will demonstrate.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION, St. James' Hospital, Ouseley-road, Balham.
Wednesday, June 27th.—4 p.m., Mr. O. L. Addison: Some Urinary Problems in Childhood (lantern lecture).

UNIVERSITY OF BIRMINGHAM.
Tuesday, June 26th.—3.30 to 5 p.m. (at the General Hospital), Dr. Ernest Bulmer: Some Diseases of Bone.
Friday.—3.30 to 5 p.m. (at the Queen's Hospital), Dr. A. V. Neale: Demonstration of Medical Cases.

LEEDS GENERAL INFIRMARY.
Tuesday, June 26th.—3.30 p.m., Dr. Bibby: Demonstration of Venereal Cases.

Births, Marriages, and Deaths

BIRTHS

McNeill Love.—On June 12th, at Stormont-road, Highgate, the wife of R. J. McNeill Love, F.R.C.S., of a son.

DEATHS

Foster.—On June 16th, at Fincham, Michael George Foster, O.B.E., F.R.C.P., only son of the late Sir Michael Foster, K.C.B., F.R.S., aged 69.

James.—On June 18th, suddenly, Arthur William James, M.D., of Gloucester-terrace, W.

Roberts.—On June 17th, at Sevenoaks, John Francis Roberts, M.D., of Garston, Liverpool, aged 47.

Smallwood.—On June 18th, at Little Waltham, Chelmsford, Robert Percy Smallwood, M.B., aged 64.

Story.—On June 15th, at St. Thomas's Hospital, Arthur Gordon Story, M.B., of Oak Hill-avenue, N.W.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

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[1] Advice to the Expectant Mother on the Care of her Health. Third edition. By F. J. Browne, M.D., D.Sc., Professor of Obstetric Medicine in the University of London. Edinburgh: E. and S. Livingstone. 1934. Pp. 48. 6*d.*

[2] See The Lancet, 1933, ii., 392.

ADDRESSES AND ORIGINAL ARTICLES

FUNCTIONAL EFFICIENCY AND BODY-BUILD IN THE YOUNG MALE ADULT

By H. A. Treadgold, M.D., M.R.C.P. Lond.
GROUP CAPTAIN, ROYAL AIR FORCE

Functional efficiency.—This term is used in the present paper to imply the possession of the three following attributes: (1) capacity to endure severe or prolonged physical stress; (2) capacity to endure severe or prolonged mental stress; (3) a high resistance to disease and a more rapid recovery-rate than normal if any such disease is contracted.

Body-build.—This term is used to express the relationship between age, height, and weight, and is recorded in terms of weight. Under-weight and over-weight are shown in kilogrammes below and above normal standards respectively. This normal weight for any given age and height can be obtained from various tables, principally American.

The "seven offices" tables,[1] compiled from 28,697 British males examined for life insurance in this country during 1921 and 1922, are used as a standard in the present paper. They cover ages from 15 to 60 and heights from 5 ft. 3 in. (160 cm.) to 6 ft. 2 in. (188 cm.). To avoid the inconvenience of having to refer to the tables on every occasion, F. H. Sherriff[2] suggested a formula for weight in pounds and height in inches, as follows:—

$$\text{Weight in pounds} = 2/3_x + 4(h_x - 61) + 100$$

where x = age, and h_x = height in inches at age x

and stated that in extreme cases—i.e., where the age was over 50 or the height over 72 in.—the error rarely exceeded 2 per cent., and for average ages not more than 1 per cent.

As the age-limits involved in the cases to be considered vary between 18 and 40, Mr. Sherriff has kindly provided me with two further formulæ, which, owing to the smaller range of age involved, are still more accurate.

To calculate weight in kilogrammes:—

$\text{Weight} = 2/5_x + 2/3h_x - 60$, where h_x = height in cm. at age x.

For pounds and inches, formula is:—

$$\text{Weight} = 1/11(10_x + 43h_x) - 145.$$

Even for extremes of height the error rarely exceeds 1 per cent., whichever formula is used.

The body-build of all cases shown in this paper has been obtained from the tables themselves, as the formulæ are necessarily not so accurate, but for approximate calculation of body-build they are both useful and convenient. Stripped weights and actual heights were obtained in all cases.

In order to study the connexion, if any, between variations in body-build and functional efficiency, it is first necessary to determine the average body-build of entrants to the Royal Air Force at the time of entry. Airman recruits and pilots must be considered separately as the former are examined at the R.A.F. Recruiting Depôt and considered only as to their fitness for general service, whereas pilots are examined at the Central Medical Establishment and undergo a much more searching examination. It should be explained that the term "airman" in the R.A.F. is used to designate "other ranks" as distinguished from officers. It does not, per se, imply flying capacity, but certain specially selected airmen are trained as pilots and are examined at the Central Medical Establishment in the same way as other pilots, prior to acceptance. "Pilots" include these, but consist mainly of officers.

Fig. 1 shows the body-build on entry of 1000 accepted airman recruits. These figures were obtained from the first 200 accepted during each of the five years 1928–32. The black column shows the percentage whose actual weight agreed, to the nearest kilogramme, with the normal weight for their age and height shown in the "seven offices" tables ("correct" weight). The shaded portion on each side of the black column shows the percentage falling within limits arbitrarily selected as representing a reasonable allowance for normality, and extends from −3 to +3 kilogrammes—i.e., a total range of 7 kg., equivalent to somewhat over 1 st. ("normal" cases). To the left of the shaded portion the height of the various columns shows the percentage of recruits with increasing degrees of under-weight on entry, as one reads from right to left ("under-weight" cases). The columns on the right of the shaded portion similarly show percentages in the case of over-weight recruits ("over-weight" cases). It will be seen that there are more than twice as many cases to the left of the shaded portion (31 per cent.) (under-weight cases) as there are to the right (15 per cent.) (over-weight cases).

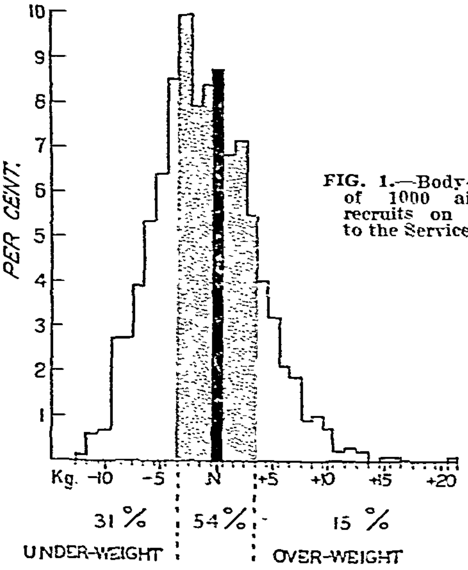

FIG. 1.—Body-build of 1000 airman recruits on entry to the Service.

This and the succeeding diagrams show the percentage distribution in one kilogramme weight-groups. The height of the black column gives the percentage of those whose actual weight agreed with that calculated from their age and height. The breadth of the column represents one kilogramme. The black column and shaded portion extending from −3 kg. to +3 kg. represent the amount allowed for normality. To the right and left of this the height of the columns shows the varying percentage distribution of over-weight and under-weight groups respectively. Average age of recruits on entry was 19 years.

Fig. 2 shows a similar series of 1000 consecutive cases of successful candidates for piloting examined at the Central Medical Establishment. Compared with Fig. 1, the main difference is that now there is a greater proportion of over-weight cases (29 per cent., compared with 15 per cent. among airmen), and a smaller proportion of under-weight cases (22 per cent., compared with 31 per cent. in airmen). The percentage of those of normal body-build as represented by the shaded and black portions of both figures is 54 for airmen and 49 for flying candidates.

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[1] Tyler, V. W.: Jour. of Inst. of Actuaries, 1923, liv., 216.

[2] Ibid., 1933, lxiv., 106.

These differences are probably due to two main causes :—

(1) Candidates for flying come mainly from a higher social class than airmen, and have the advantages of a more ample and varied dietary and better hygienic surroundings in childhood and adolescence, as well as the opportunity of indulging to a greater extent in games and athletics.

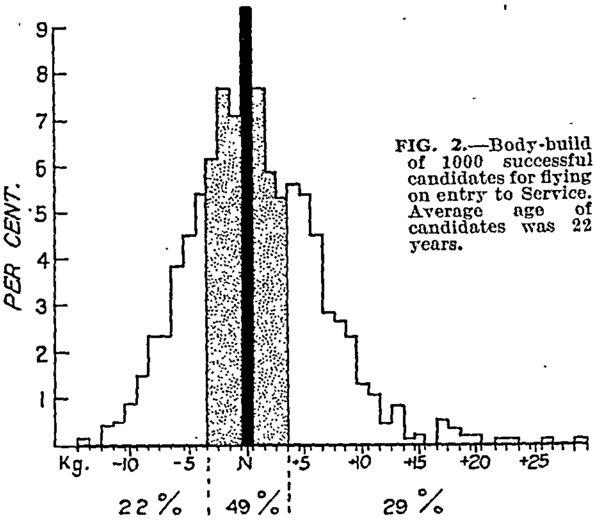

FIG. 2.—Body-build of 1000 successful candidates for flying on entry to Service. Average age of candidates was 22 years.

(2) The higher standard of fitness required in a prospective pilot results in the rejection of many who would be passed fit for " general service " alone.

As an illustration of this, all available cases rejected for flying on grounds of cardiovascular inefficiency (220), as judged by the R.A.F. tests and standards, were collected, and Fig. 3 shows that the proportion of over-weight to under-weight cases in this group compared with successful candidates shows a striking change, as the under-weight group has increased from 22 to 43 per cent., and the over-weight group has decreased from 29 per cent. in successful candidates to 14 per cent. among those rejected. Many of these cases were well up to the recruiting standard for airmen and none of them had any organic disability.

In order to investigate what relation, if any, existed between body-build and capacity to endure severe or prolonged physical stress, the body-builds of as many airmen as possible, who competed in the R.A.F. athletic championships at Uxbridge in 1933, were obtained at the commencement of training. Fig. 4 shows the body-build of these men and the marked preponderance of over-weight to under-weight cases —i.e., 4 to 1, in striking contrast to the 1 to 2 proportion in the case of recruits (Fig. 1). As a control to these figures, the body-build of 500 airmen was obtained from 25 R.A.F. stations at home in 1933 (Fig. 5). Their only qualification for admission to the series was that none of them had competed in the championships—in other words, they were a fairly typical example of the ordinary serving airman. Fig. 5 shows that although the proportion of over-weights among this control-group is higher than among recruits on entry, it is still far below the corresponding proportion in athletes in Fig. 4.

A further analysis of this series, divided up according to the different events in which they competed, is shown in Fig. 4, *a*, *b*, *c*, *d*. In the tug-of-war teams (Fig. 4 *a*) there is, as might be expected, an overwhelming preponderance of over-weights to under-weights (22 : 1). In the field events (Fig. 4 *b*) this is not so marked (6 : 1), but still very definite. In the sprints (100 yards, 220 yards, quarter-mile, 120 yards hurdles) (Fig. 4 *c*) it is reduced to 4½ : 1. In the long-distance events, however (Fig. 4 *d*), for the first time there is a definite preponderance of under-weights, who are 2½ times as numerous as over-weights.

The personnel of the recent Mount Everest Climbing Expedition, who were examined at the Central Medical Establishment before they left for India, shows an even more pronounced under-weight tendency. Of the 15 individuals examined, only 1 was over-weight (+16 kg.); his general physical condition was poor and he proved a failure. Of the remaining 14, half were definitely under-weight (more than −3 kg.) and the remainder normal (within ±3 kg. of their calculated weight from age and height).

Where sheer bodily strength is an essential factor, as in the tug-of-war and, to a less extent, in the field events, over-weights might reasonably be expected to preponderate. The marked difference in body-build between sprint and long-distance athletes, however, requires some explanation. In sprint work there is a maximum and prodigal expenditure of energy regardless of consequences for a brief period. A big frame with a well-developed and powerful musculature is best adapted to meet this, as the extra weight involved is not a serious handicap where the effort is maximal for a brief period. Long-distance work, on the other hand, involves far less expenditure of energy over the same period and its conservation is all-important. Extra body-weight must inevitably increase the work thrown on the heart, and the longer the distance the more important does this factor become. Consequently, the individual with the minimum body-weight consistent with adequate performance is likely to prove most successful in the long run. The average height and weight of the entrants of the long-distance events were 173 cm. and 63 kg., compared with 175 cm. and 68 kg. of the sprint entrants.

The conclusion to be drawn is that capacity to endure severe or prolonged physical stress, as illustrated by proficiency in athletics, is met with more frequently in over-weight than in under-weight individuals, but there is a definite exception to this general rule in the case of long-distance athletes, in whom the converse occurs. The Mount Everest personnel is a good illustration of this point.

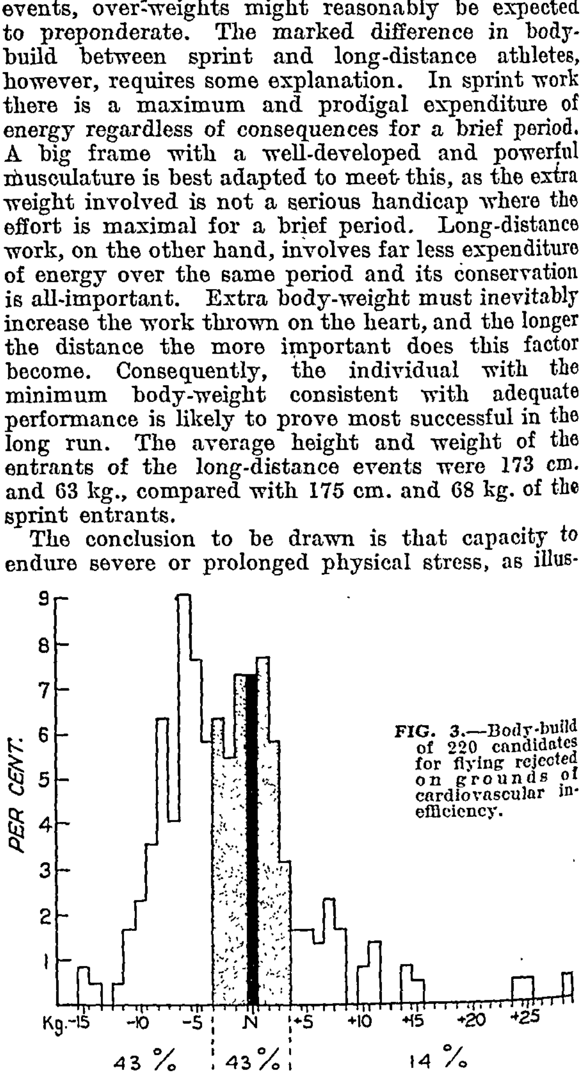

FIG. 3.—Body-build of 220 candidates for flying rejected on grounds of cardiovascular inefficiency.

The connexion between liability to disease and body-build was investigated by studying the body-build on entry of as many cases as possible among both airmen (ground personnel) and pilots, invalided from the service on purely medical grounds, no surgical cases being included. If it is granted that these cases represent, as a class, individuals whose powers of disease-resistance and recovery are below the normal of their class, a comparison between the body-build of the invalids on entry and of the normal airman or pilot will then show what part, if any, body-build plays in this connexion. Airmen and pilots must be considered separately owing to the different medical standards of entry, the different nature of their duties, and also their different treatment when the question of invaliding arises.

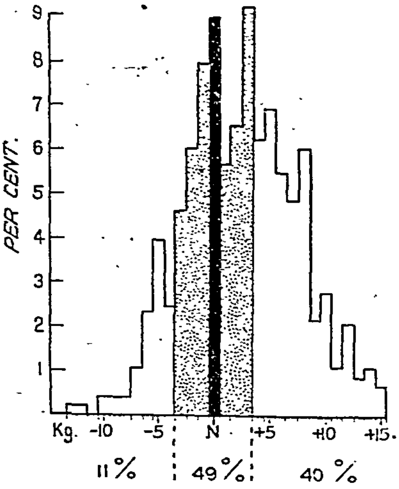

FIG. 4.—Body-build of 482 airmen in R.A.F. Athletic Championships in 1933. Average service five years.

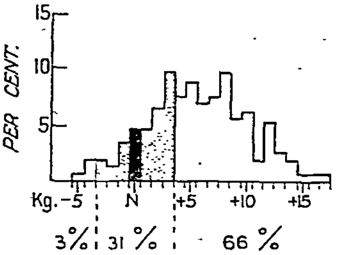

FIG. 4 a.—Body-build of 157 airmen competing in tug-of-war teams.

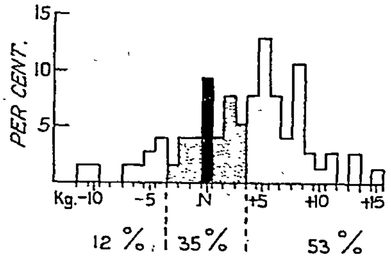

FIG. 4c.—Body-build of 77 airmen competing in sprint events.

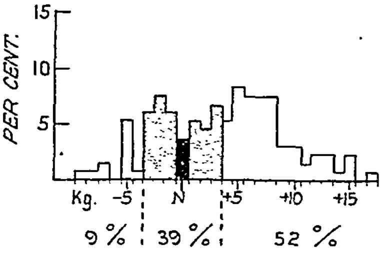

FIG. 4b.—Body-build of 134 airmen competing in field events.

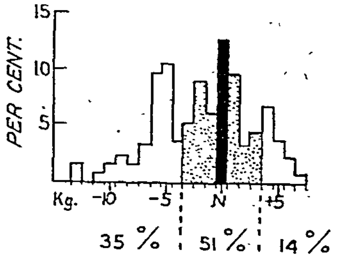

FIG. 4d.—Body-build of 130 airmen competing in long distance events.

AIRMEN

Fig. 6 shows the body-build on entry of 340 cases of airmen invalided from the Service on purely medical grounds. Comparison with Fig. 1 showing the body-build of airmen on entry reveals that the proportion of under-weight to over-weight individuals has altered from 2 : 1 to 6 : 1, the actual figures being 48 per cent. under-weight compared with 8 per cent. over-weight. Put in another way, practically half of all airman medical invalids are more than −3 kg. under-weight on entry to the Service. Fig. 7, based on the 340 cases of airman invalids, shows the relative likelihood of an airman being invalided according to his body-build on entry. Where the thick lines intersect in the middle of the diagram, the probability is represented as unity. Below this point it is less than one, above it greater than one, the ratio being indicated by the figures on the left and right of the diagram starting at 0·4 below and reaching to 4 above. To the right and left of the middle line the body-build is expressed in kilogrammes above or below normal for age and height. It will be noticed that the curve is above normal for all under-weight groups and becomes steeper as the degree of under-weight increases. The curve is below normal in cases of moderate over-weight. The diagram shows two main points :—

(1) The greater the degree of under-weight on entry the higher is the probability of invaliding.

(2) The minimum probable invaliding-rate occurs among those who are +3 kg. to +6 kg. on entry.

This is interesting as bearing out the experience gained in the examination of pilots at the Central Medical Establishment, that a high degree of functional efficiency, as shown by the examination as a whole, is usually associated with a moderate degree of over-weight on entry.

In order to investigate the question whether different classes of disease were associated with different degrees of body-build on entry, all cases were divided up into infective diseases (148 cases), non-infective diseases (90), and psychic disorders (102).

The commonest form of infective disease was pulmonary tuberculosis (37), in which only 1 case was over-weight (+5 kg.) on entry. The most frequent diseases among the remainder were other chronic lung conditions exclusive of asthma (14), chronic otitis media (30), and rheumatic carditis (19). Fig. 8 shows that the ratio of under-weight to over-weight cases on entry among this class is 8 to 1.

The commonest causes of invaliding in the non-infective group were epilepsy (24), defects of vision (18), organic nervous disease (13), and gastric conditions (9). Fig. 9 shows that the proportion of under- to over-weights on entry was less than in Fig. 8—i.e., 5 to 1—but still more than twice as much as the normal proportion on entry (Fig. 1).

The remaining group of psychic disorders includes the psychoses and psychoneuroses (Fig. 10). This group is taken as illustrating the type of airman who would probably be incapable of withstanding severe or prolonged mental stress in that this type has already broken down under the minor stresses of peace-time. Here, too, the under-weight class shows a preponderance of 4½ to 1, less than in the other two groups but sufficient to suggest that the under-weight recruits as a class have less capacity to withstand mental stress than those whose body-build is above normal.

PILOTS

Invaliding figures from medical causes among pilots, almost entirely officers, comprise 147 cases. Fig. 2 showed that there was a preponderance of over-weight to under-weight cases on entry of roughly 5 to 4. Fig. 11 shows that among the invalids this ratio was practically 1 to 3. Comparison with the similar figures for airmen (Figs. 1 and 6) shows that the swing to the left is approximately the same among both pilot and airman invalids when their marked difference of body-build on entry is taken into account.

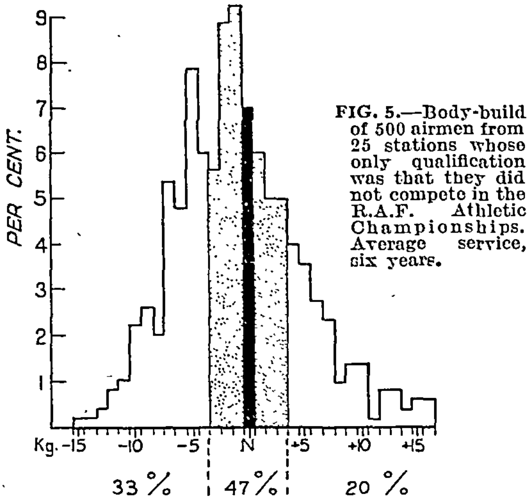

FIG. 5.—Body-build of 500 airmen from 25 stations whose only qualification was that they did not compete in the R.A.F. Athletic Championships. Average service, six years.

Analysis of the figures under the three heads of infective, non-infective, and psychic causes shows a marked difference from the airman group.

(1) The infective group is the smallest (32 cases), representing 22 per cent. of the whole compared with 44 per cent. among airmen. This marked difference is probably due to two main factors: (*a*) the more careful selection of pilots on entry, and (*b*) the fact that the conditions of officers' service are more comfortable, and they are treated with more leniency than airmen as regards sick leave if there are reasonable prospects of ultimate return to full duty and allowed a prolonged period of home service under such conditions.

(2) The non-infective group is a larger one (48 cases), equal to 33 per cent. of the whole, compared to 26 per cent. among airman invalids. Here again no comparison can be made, because more than half the cases among pilots were due to disabilities affecting only their efficiency as pilots, such as defective oculo-motor balance (31 per cent.) and air-sickness (20 per cent.). Neither of these is a cause of invaliding among airmen.

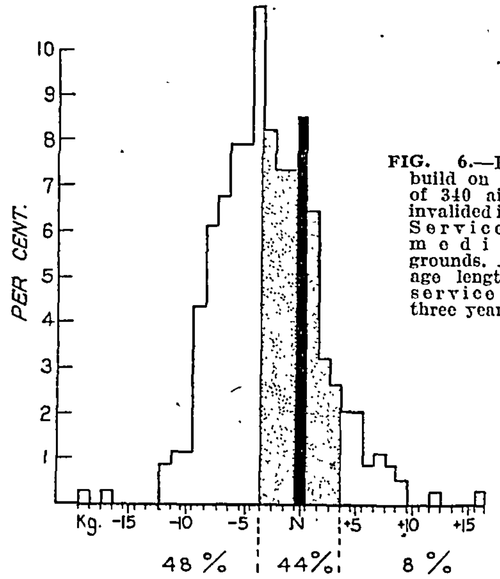

FIG. 6.—Body-build on entry of 340 airmen invalided in the Service on medical grounds. Average length of service was three years.

(3) Psychic disorders represent the largest class (67 cases), 45 per cent., compared with 30 per cent. among airmen. Here again the two are not analogous, as a third of the cases among pilots consisted of anxiety neurosis due to flying, a class not represented among airmen. A young pilot has to be fit for full flying duties, and if he develops an anxiety neurosis to a degree that medical opinion considers a permanent bar to active service flying, he is usually invalided, although many of such cases are quite fit for general service apart from flying. The psychoses represent a third of the total invalidings among airmen, but among pilots only 2 per cent. were invalided from this cause. This difference is probably due to the more searching examination of pilots on entry.

The question next arises to what extent individuals of one body-build group are liable to increase or decrease in weight beyond the normal amount that occurs with age. Reference to Fig. 1 (body-build of airmen on entry) and Fig. 5 (body-build of representative airmen in the Service) shows that the under-weight group has remained very much the same at 31 and 33 per cent. respectively, but that there is a slightly larger increase in the over-weight group, the original 15 rising to 20 per cent. A corresponding sample of 500 serving pilots also shows the largest increase in the over-weight group. Thus the percentage of under-weight pilots on entry was 22 per cent. (Fig. 2), and while serving 23 per cent. The percentage of over-weights, however, increased from 29 per cent. on entry to 38 per cent., twice as

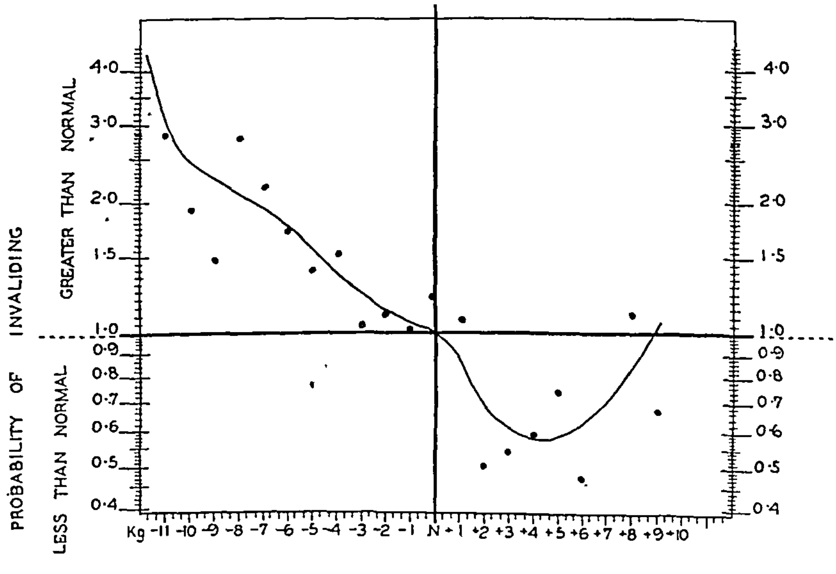

FIG. 7.—Showing ratio of probability of invaliding in airmen according to their body-build on entry to that in airmen of "correct" body-build.

much, in fact, as in the airmen. Finally, if the body-build of the R.A.F. athletes (Fig. 4) is compared with their own body-build on entry, we find that the percentage of over-weights has practically doubled (from 22 to 40 per cent.) and the percentage of under-weight cases has, unlike the other two groups in which it has remained much the same, undergone the marked diminution from 29 to 11 per cent.

This increasing tendency towards over-weight as one goes from the control-airman group to the pilot group, and finally to the athlete group, is probably due to the different amounts of physical exercise and training, both of which are well-known factors in weight production, in the three groups.

Alteration in the under-weight group is, in fact, almost confined to the athletes, among whom these factors would naturally play the major part. The liability of athletes to put on weight after training or, as the saying is, "turn their muscle into fat," is probably due to the continuance of the excellent appetite acquired as a result of continued exercise, when there is no longer any need for it. The natural result is the deposition of fat generally over the muscles.

It must not be assumed, however, that apart from athletes individuals under-weight on entry remain so or that the increasing percentage of over-weights during service is entirely at the expense of the normal body-build group. This is not so; there is a definite degree of interchange among all three groups, but it is rare to find members of the under-weight group becoming over-weight or vice versa.

The most stable of the three is the over-weight group. Among athletes, 86 per cent. of cases over-weight on entry remained so after five years' service; in the control-airman group, 80 per cent. after six years' service. None of the athlete over-weights became under-weight and only 5 per cent. of the airmen. The least stable of the three groups is the under-weight. Thus of the athletes under-weight on entry only 30 per cent. remained so, the balance becoming normal (62 per cent.) and over-weight (8 per cent.). Among the airman group, 48 per cent. remained under-weight and 8 per cent. changed to the over-weight group.

Approximately half of all airmen invalided from medical causes were −4 kg. or lighter on entry to the Service. This figure rises to 70 per cent. if all cases are taken whose body-build was −1 kg. or lighter (Fig. 6). It would appear on the face of it that the bulk of medical invaliding could be avoided by admitting into the Service only those recruits whose weight was "correct" or greater. In the first place, however, the material is not available, and in the second place it has been shown already that there is a definite percentage of under-weight individuals who are functionally efficient

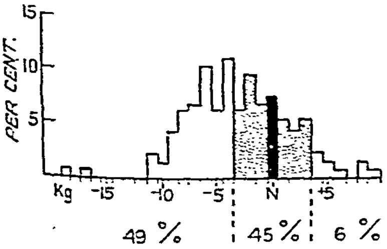

FIG. 8.—Body-build on entry of 148 airmen invalided on account of infective disease.

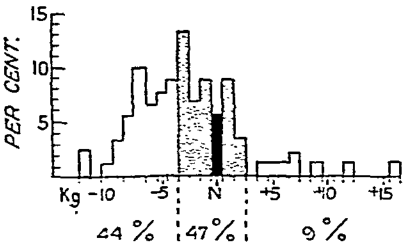

FIG. 9.—Body-build on entry of 90 airmen invalided on account of non-infective disease.

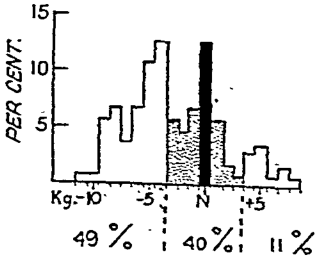

FIG. 10.—Body-build on entry of 102 airmen invalided on account of psychic disorders.

to a high degree. Consequently, the essential point is the differentiation at the time of entry of the under-weight who is functionally efficient and likely to remain so, from the under-weight who, even if passably fit on entry, is unlikely to stay so. This is a comparatively easy matter if attention is paid to the following points.

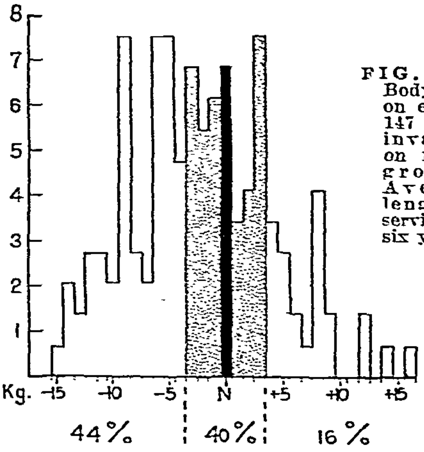

FIG. 11.—Body-build on entry of 147 officers invalided on medical grounds. Average length of service was six years.

It should be borne in mind that the typical under-weight is usually of poor physique, is not as a rule efficient in athletics, and tends to have a small heart and consequently tachycardia, and a narrow, poorly developed chest with a subnormal vital capacity. In addition, his family and personal history tends to reveal evidence of poor mental stamina, and his previous illnesses are usually more frequent and their duration longer than normal.

If, however, on examination a candidate, although under-weight, has a good games history, a pulse below 72—the lower the better, as indicating the possession of a heart whose output per beat is above average—a good vital capacity, and a clean family and personal medical history, little risk will be incurred in accepting him. Difficulty occurs in the under-weight cases between these two types, and the physical efficiency tests employed in the R.A.F. are particularly valuable in final assessment.

Under-weights, apart from the tuberculosis risk which occurs mainly below the age of 30, are viewed as a whole with greater favour than over-weight individuals by life insurance offices owing to their better expectation of life. This is probably due to the relatively sheltered lives they lead owing to their tendency to poor functional efficiency and also to their proneness as a class to arterial hypotension and consequent relative immunity to most of the cardiovascular catastrophes of later life. From the point of view of sickness insurance, however, the under-weight compared with the over-weight individual appears to be more undesirable owing to increased liability to disease.

CONCLUSIONS

(i) There is a definite relationship between varying degrees of body-build and functional efficiency, whether viewed from the points of capacity to endure severe or prolonged physical or mental stress or resistance to disease generally.

(ii) Capacity to endure severe or prolonged physical stress as evidenced by athletic prowess is found most commonly among over-weights. An exception to this is seen in long-distance athletes among whom under-weight is commoner than over-weight.

(iii) Incapacity to endure severe or prolonged mental stress, as evidenced by invaliding from the Service through psychic disorders, is commoner among individuals under-weight on entry to the Service than among over-weights.

(iv) This applies also to disease as a whole, and particularly in the case of infective diseases, such as pulmonary tuberculosis. The greater the degree of under-weight on entry, the greater the likelihood of invaliding from the Service on medical grounds.

(v) It is uncommon for over-weight individuals to become under-weight and vice versa.

(vi) As a general rule it is not difficult to distinguish between the "fit" and "unfit" types of under-weight by careful examination.

My cordial thanks are due to those of my brother medical officers of the Royal Air Force who have furnished many of the figures relating to airmen, and to Miss I. M. Marshall for her valuable assistance in the preparation of diagrams and figures.

INCIDENCE OF
HUMAN AND BOVINE BACILLI IN TUBERCULOUS MENINGITIS

BY A. STANLEY GRIFFITH, M.D. Vict., Ph.D. Camb.
MEMBER OF THE SCIENTIFIC STAFF, MEDICAL RESEARCH COUNCIL

IN a paper published in 1932[1] I summarised the results of typing strains of tubercle bacilli obtained from 140 cases of tuberculous meningitis occurring in this country, which had been investigated during the years 1905 to 1931 by L. Cobbett, A. Eastwood, F. Griffith and myself.

The strains of tubercle bacilli were derived in 77 instances from post-mortem material and in 63 from cerebro-spinal fluid withdrawn during the life of the patient. In the first or necropsy series, which were mostly examined before 1914 and were to some extent selected, since search had been made for cases in which the portal of entry appeared to be the alimentary tract, the percentage of bovine infections was 19·5 (62 human and 15 bovine), while in the second or cerebro-spinal fluid series, collected mainly after the year 1920, the percentage bovine was 30·2 (44 human and 19 bovine). Thirty of the latter group were examined by me between March, 1930, and July, 1931, and of these 10 were bovine infections. Thus, it is seen that the percentage of bovine cases in the most recent series, in which there was no element of selection, was 33·3 or more than half as high again as in the first series, although as I have already mentioned the latter were specially selected on account of their supposed alimentary origin. The cases in the two series were not, however, obtained from the same part of the country, those in the first having been derived mainly from hospitals in London, whereas those in the second came from other and widely separated localities, including country districts, in England. For this reason one could not decide whether the higher bovine percentage in the recent series signified an increase of late years in the relative frequency of bovine infections in tuberculous meningitis, or was referable merely to the different provenance of the cases.

In order to clear up these points it was necessary to undertake further investigations. The inquiry was therefore continued with the object of ascertaining the relative incidence of the human and bovine types in tuberculous meningitis in various parts of England and Scotland.

Nature and Source of Material

The material used in the investigation was principally cerebro-spinal fluid withdrawn by lumbar puncture during the life of the patient. In a few cases of tuberculous meningitis material from autopsies was investigated in addition to spinal fluid, and in eight cases post-mortem material only was used.

The use of cerebro-spinal fluid as original material, as I have previously pointed out (loc. cit.), has a special value from the statistical point of view. In the first place a far greater number of cases of tuberculous meningitis occurring in a locality can be examined than if one depended on material from autopsies, which moreover would not give a fair sample. In the second place the typing of strains of tubercle bacilli from cerebro-spinal fluid gives some indication of the extent to which at present the general population is being infected with bovine bacilli, since tuberculous meningitis occurs mainly in young children and in them supervenes comparatively closely on infection.

Determination of the types of tubercle bacilli in tuberculous meningitis would be of great value to health authorities in yet another way, as K. A. Jensen[2] has also suggested. If periodical investigations of all cases occurring in selected areas over certain periods were made, the data so obtained would enable one to estimate the effectiveness of measures taken to reduce the incidence of tuberculosis in cattle, particularly if the cases came mainly from rural and urban districts where milk is not heat-treated before sale for direct consumption.

During the period from December, 1931, to December, 1933, material was received from 204 cases. Of these 188 yielded cultures of tubercle bacilli, while the remainder (15 spinal fluids and one autopsy) were negative, neither direct cultures nor tuberculosis in guinea-pigs being produced. The cultures were all obtained in my laboratory with the exception of those (see Table I.) which were kindly sent to me by Drs. F. Griffith and W. M. Scott (Ministry of Health), and Dr. W. T. Munro (Glenlomond Sanatorium). In each of 16 cases the material received was an uncut inguinal gland of a guinea-pig which had been inoculated subcutaneously with spinal fluid; for these I am indebted to Drs. Constant Ponder and J. Menton, bacteriologists to the Kent and Stafford county councils respectively.

The cases of tuberculous meningitis were derived from the following places in England and Scotland: Kent, Bristol, Gloucester, Wolverhampton, Stafford, Sheffield, Manchester, Liverpool, Leeds and the West Riding, Hull, Newcastle-upon-Tyne, Ayr, Dundee, and Aberdeen. To the medical officers of health of the cities, towns, and county councils, and to various physicians and bacteriologists who have aided me in this inquiry, I wish to express my grateful thanks.

Methods of Examination and Results

Each specimen of cerebro-spinal fluid was injected subcutaneously into one or two guinea-pigs, and at least one strain of tubercle bacilli from each case was obtained either through the guinea-pig or directly from the original material. The guinea-pigs were killed in from 18 to 42 days and cultures were invariably made from the glands adjacent to the seat of inoculation. Where two guinea-pigs had been inoculated the second was held in reserve in case the first attempt at culture failed or, when necessary, for confirmation of the first result. In 38 out of 58 cases cultures were also obtained directly from the cerebro-spinal fluid, the undiluted fluid or centrifuged deposits being sown after treatment with potassium hydrate (2·5 per cent. in the mixture) or sulphuric acid (3 per cent.). The number of colonies obtained in direct cultures varied from one to numerous. In two cases cultures were obtained both from the cerebro-spinal fluid and from post-mortem material, and in eight cases from post-mortem material only.

The total number of strains from the 188 cases was 237, of which 222 were derived from cerebro-spinal fluid (38 direct and 184 through the guinea-pig) and 15 from post-mortem material. In every instance where two or more strains from a single case were examined these proved to be identical in cultural characters and, where this was tested, identical also in virulence.

The primary cultures were made both on plain egg and on 5 per cent. glycerin egg. The characters of the colonies of tubercle bacilli on these two media enable one, as I first pointed out in 1914,[3] to decide in almost every case, and generally within four weeks, to which type (human or bovine) a strain of tubercle bacilli belongs. (The avian bacillus can also be distinguished in primary cultures but has never been found in human tuberculous lesions in Great Britain.) All the strains in this series were either human or bovine. As the cultural differences between human and bovine tubercle bacilli are well known it is unnecessary to give a detailed description of the cultural characters of the various strains obtained, and I shall merely state how many were human and how many bovine. With regard however to those strains of human type, which were not tested as to their virulence, I may mention that no strain was classified as "eugonic human" unless it produced abundant wrinkled growths on glycerinated potato, which in my experience is the most reliable medium for differentiating eugonic human from dysgonic human and bovine strains.

Of the 188 cases of meningitis 140 yielded eugonic human strains. Five only of these strains were tested as to their virulence, one rabbit being inoculated subcutaneously with each, the doses ranging from 20 to 50 mg. The five rabbits were killed 90 to 182 days after inoculation and in two the lesions were limited to the seats of inoculation, while in three there were in addition to local abscesses a few small lesions in the lungs and in one a slightly enlarged purulent scapular gland.

The remaining 48 cases yielded cultures with the cultural characters of the bovine type of tubercle bacillus. All these strains were tested as to their virulence for the rabbit by the subcutaneous or the intravenous inoculation of culture. The test suspensions of culture for subcutaneous inoculation were prepared by a simpler method than in previous investigations.

Instead of subculturing a strain for several generations and giving weighed amounts of culture I took either primary egg cultures from three to four weeks old, or first subcultures on egg four to six days old, the latter being made by spreading over the surface of each tube a drop of an emulsion of a primary culture. It was found that an average tube thus sown and incubated for from 5 to 6 days yields when scraped about 1·0 mg. of culture. The suspensions for inoculation were prepared directly in the culture tubes by rubbing off the growths with a spatulated platinum wire and suspending them in physiological salt solution; young cultures of bovine bacilli readily form homogeneous suspensions. From one to five tubes were used, the larger number only when the primary cultures showed not very numerous colonies. The doses therefore varied but never exceeded 10·0 mg. which was the standard dose in previous investigations, and ranged usually from about 1·0 to 5·0 mg. As will be seen, although the doses were generally much less than 10·0 mg., the duration of life of the rabbits and the severity of the disease produced showed much the same range of variation as in previous series where the dose was always 10·0 mg.

Altogether 50 dysgonic strains from 48 cases of tuberculous meningitis were tested on rabbits, six of them intravenously* and the rest subcutaneously. All the strains proved highly virulent for the rabbit, producing severe general tuberculosis identical with that which follows similar inoculation of bovine tubercle bacilli of direct bovine origin. With three strains the tests had to be repeated because the rabbits, inoculated subcutaneously, died in 19, 20, and 23 days, and the tuberculosis though generalised was insufficient to account for death. The subsequent tests showed these strains to be fully virulent.

Excluding the three rabbits dying prematurely and two others which survived 101 and 105 days there are 47 subcutaneously inoculated rabbits which died of general tuberculosis in from 28 to 95 days, the average duration of life being 52·3 days. The rabbits which died in 101 and 105 days had been given small doses—namely, one primary culture each; the tuberculosis produced however was severe and typical. The six rabbits injected intravenously died of general miliary tuberculosis in from 23 to 53 days.

Another dysgonic strain obtained in the course of this investigation, from a woman of 27 who had had no illness previous to the meningitis, has had to be omitted because its type has not yet been definitely ascertained. This strain was tested subcutaneously on a rabbit, the growth from one primary culture being inoculated. The rabbit was killed 108 days later, having nearly doubled its weight, and was found to have a local lesion and a few foci in the lungs only. The virulence test was repeated and two rabbits were inoculated intravenously, doses 0·01 and 0·1 mg. These were killed 71 and 49 days later and found to have slight general tuberculosis. These experiments showed that the strain though resembling dysgonic bovine bacilli in cultural characters had no greater virulence for the rabbit than human tubercle bacilli. In order to decide whether the strain was an attenuated bovine strain or a very unusual dysgonic form of the human group of bacilli further tests of virulence were necessary. These have been made on rabbits and guinea-pigs but are not yet completed.

Sources of Infection

Inquiries were made into the milk-supply in the majority of the bovine cases of meningitis with the object of tracing the source of the bovine bacilli. Such inquiries could be expected to be fruitful only in cases where the interval between tuberculous infection and the occurrence of tuberculous meningitis was comparatively short, as it often is in quite young children. Where tuberculous meningitis due to bovine bacilli supervenes in the course of chronic tuberculosis it is too late to investigate the milk-supply. In a few instances the inquiries led to the discovery of cows giving tuberculous milk and to their slaughter earlier than otherwise would have been the case, but they mostly had negative results, the veterinary inspectors failing to find, or to obtain a history of a clinical case of tuberculosis in the herds supplying the milk.

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* By Dr. W. T. Munro.

The following are examples of the results of the inquiries. At one farm the cows were inspected and appeared healthy but a group sample of the milk, taken immediately after the inspection, was shown by the guinea-pig test to contain tubercle bacilli. The farm was visited again and after a more thorough examination of the cows one suspicious animal was picked out. A sample of her milk was taken and was found to contain tubercle bacilli. The cow was then slaughtered and showed extensive tuberculosis.

Of the inquiries which were inconclusive as regards the source of infection the following may be quoted.

Two children, 15 months and 2 years of age respectively, from different households in the same street and receiving milk from the same producer-retailer, died within about six months of each other of tuberculous meningitis due to bovine bacilli. A bulk sample of this man's milk was tested and gave a negative result. Sufficient time however had elapsed before the taking of the sample for a doubtful cow to have been removed from the herd. In this instance I asked the medical officer of health (Kent) if other cases had occurred which could be attributed to this retailer's milk and he informed me that there was one child suffering from abdominal tuberculosis. In another instance a boy of 3 years died of tuberculous meningitis due to bovine bacilli and an infant of 11 months (not investigated) who had been supplied with milk from the same source was suffering from tuberculous peritonitis. The conditions on this farm (in Kent) were most unsatisfactory, though none of the cows appeared to be giving tuberculous milk. The farmer of course had been notified that his herd was to be inspected and had had ample time to dispose of any animal which he did not wish the veterinary surgeon to see.

In one case, a child of 6 years, infected with bovine bacilli, the autopsy (performed by Dr. S. C. Dyke, Wolverhampton) showed no lesions in the mesenteric or the tracheo-bronchial glands. The lungs, however, were extensively tuberculous and cultures of bovine bacilli were obtained from them as well as from the spleen and the meninges. The father of the child was said to have pulmonary tuberculosis, but a specimen of his sputum could not be obtained. With regard to the portal of entry of the bacilli in this case, it is uncertain whether the infection was through milk or transmitted from the father.

In all other cases with a family history of tuberculosis the bacilli causing the meningitis were found to be of the human type. Two of these cases were sister and brother, aged 2½ and 4½ years, and they died within two months of each other. Their mother suffered from pulmonary tuberculosis and was discharging tubercle bacilli in her sputum.

Distribution of Lesions found at Autopsy

The post-mortem notes of 33 of the cases investigated have been sent to me and are summarised as follows. The tubercle bacilli responsible were of the human type in 21 and of the bovine type in 12 cases.

Of the 21 cases due to human tubercle bacilli 15 showed older and more extensive tuberculous changes in the tracheo-bronchial than in the other regionary lymphatic glands, indicating infection by way of the respiratory tract, while of the remaining six the channel of infection was uncertain in four and probably alimentary in two.

In eight of the first group of 15 cases the lungs contained in each instance, besides miliary tubercles, a caseous nodule or mass, which was considered to represent the primary lesion, and in seven no primary lung focus was found. Of the six cases in the second group, in two the regional lymphatic glands were not examined and in two both the thoracic and abdominal regionary lymphatic glands contained lesions. In a fifth case, one of general miliary tuberculosis, careful search by Dr. A. D. Fraser (Bristol Royal Infirmary) failed to reveal any disease in the tracheo-bronchial or abdominal glands, or any primary focus in the lungs. Instances of acute general miliary tuberculosis without macroscopic lesions to mark the portals of entry of the bacilli have been recorded occasionally. A. Eastwood and F. Griffith [4] reported a case of tuberculous meningitis (due to bovine bacilli) without macroscopic primary focus, and J. C. Hendrie [5] has recently reported two cases. The sixth case was remarkable for the occurrence of extremely numerous large tubercles on the parietal and visceral surfaces of both peritoneum and pleura. No tubercles were seen in the substance either of the lungs, spleen, or kidneys. The mesenteric glands were enlarged and congested, though not caseous, and the late Dr. Egerton Williams (Sheffield) thought that the infection was probably of alimentary origin.

Of the 12 bovine cases eight were straightforward instances of alimentary tuberculosis, the channel of infection being the intestinal canal. Six of the eight cases were in children 22 months, and 2, 4, 4, 4, and 6 years of age and two were in adolescents, one female and one male, both 18 years of age. In the children the mesenteric or the ileocæcal glands were extensively caseous. No intestinal ulcers were found, but the Peyer's patches in the upper ileum of one child were hyperplasic. In two of the cases there were miliary tubercles in the lungs, liver, and spleen, while in four miliary tubercles were not seen in the abdominal or the thoracic organs; in three cases the peritoneum showed miliary tubercles, in one case profuse. In none of these six cases were lesions reported in the tracheo-bronchial glands.

In the young woman the mesenteric glands were completely calcified and the lungs were closely beset with miliary caseous tubercles. At the base of the brain there were two or three small caseous nodules in addition to miliary tubercles. The youth had suffered from tuberculosis of the cervical glands in 1930, and in 1933 was treated for enlarged glands in the groin; the axillary glands were also enlarged. In December, 1933, he was notified as a case of tuberculous meningitis. At the autopsy (by Dr. M. Scott, R.M.O., Heathfield Hospital, Ayr) the lungs were found to be very adherent on both sides and extensively infiltrated with tuberculosis of a broncho-pneumonic type without cavitation or evidence of older disease. Both kidneys showed much fibrocaseous infiltration with nodules of walnut size. There was definite tuberculous meningitis with a gelatinous exudate over the base of the brain. The mesenteric glands were extensively implicated and showed partial caseation.

In the remaining four bovine cases the distribution of the lesions was unusual.

In one case, a girl of 9 years, there was general miliary tuberculosis, the lungs being closely and the kidneys sparsely beset with macroscopic tubercles, while in the liver and spleen the foci were microscopic. No lesions were found in the regional lymphatic glands, but debris suggesting diseased bone was extracted from the upper nasal area and Dr. T. B. Davie thought that this might have been the primary seat of the disease, the meninges becoming involved through the cribriform plate.

In the second case, previously mentioned, there was general tuberculosis of the lungs but no disease of the tracheo-bronchial or mesenteric glands.

In the third case, a boy of 2½ years, Dr. A. D. Fraser found caseous tuberculous glands at the hilum of the right lung, typical tuberculous meningitis, and no sign of tuberculosis elsewhere. Dr. Middleton Martin caused inquiries to be made into the family history and the milk-supply of this case. No history of tuberculosis in the parents or attendants could be elicited, but it was ascertained that the child had been supplied with milk from a tuberculous cow.

In the fourth case, a girl of 9 years, the left prætracheo-bronchial glands contained calcified and caseous material and one intertracheo-bronchial a well-encapsulated calcareous focus. There were no lesions elsewhere except on the meninges.

Thus in two "bovine" cases the oldest tuberculous lesions were seated in the tracheo-bronchial glands, and apart from tuberculosis of the central nervous system no lesions were noted in any other part of the body. Cases of this kind, where the tuberculous infection is bovine and apparently primary in the thorax, have been reported from time to time but they are rare. The first case was recorded by me in 1920.[6] Munro[7] reported three cases in 1932. Blacklock[8] described three cases, occurring among 183 autopsies, in children aged 9 months, 18 months, and 2¼ years. In these the tracheo-bronchial glands (two cases) or a paratracheal (one case) were extensively caseous but no primary pulmonary lesions were found. The three children died of general miliary tuberculosis and tuberculous meningitis.

In view of the fact that phthisis pulmonalis due to bovine bacilli is by no means rare in this country (in the last ten years or so Cumming, Munro, and Griffith have found upwards of 80 instances), it is possible that these children or some of them may have been infected with bovine bacilli from human sources.

Tuberculomata of the central nervous system were recorded in two cases only.

In one autopsy there were two cerebellar nodules, one of which was presenting on the surface. In the other there were soft caseous nodules on the meninges. In three instances it was stated that no tuberculomata were found on section of the brain. In the remainder typical meningitis only was described. It is probable that the majority of the brains were examined merely to establish the presence of tubercles on the meninges and thorough search was not made for older tuberculous foci in some part of the central nervous system or its bony surroundings. The absence of record of associated tuberculomata is not necessarily opposed to the conclusion of Rich and McCordock,[9] who believe that tuberculous meningitis can only be produced by direct extension from a pre-existing lesion in the cortex of the brain, the meninges, or the bones of the skull or the vertebræ. My experiments on animals and observations in the human subject support this view of the pathogenesis of tuberculous meningitis.

In seven of the present series of cases there were no miliary tubercles anywhere except on the meninges, the primary seats of the disease in three instances being the mesenteric glands and in four the tracheo-bronchial glands, which were enlarged and caseating. As there were no miliary tubercles elsewhere in these cases the tubercles on the meninges could not have been produced by blood-borne bacilli and must, I think, have been the result of extension of the tuberculous infection from an undiscovered focus in close relationship to the meninges.

Another case for which I think the same explanation holds good was in a boy of 4½ years, who died of tuberculous meningitis and showed at autopsy a few miliary tubercles in the liver and spleen and a single caseous slightly calcareous mesenteric gland. Dr. Nabarro sent me the gland and on microscopical examination I found numerous short acid-fast bacilli which suggested bovine infection. An emulsion of the gland however did not produce tuberculosis in guinea-pigs and direct cultures remained sterile; the bacilli were dead. In this case therefore the meningitis could not have been the result of a sudden discharge into the general circulation of large numbers of bacilli from the caseous gland.

Regional Distribution of Bovine Cases

Table I. gives the different localities contributing material, the number of cases from each locality, and the proportion of human and bovine infections in each group. With the exception of Newcastle-upon-Tyne and two counties which sent 1 and 3 cases only every locality has yielded one or more bovine cases. The absence of a bovine case in the Newcastle series is probably attributable to the small number of specimens submitted for examination and to the predominance of persons in the higher age categories (8 of the 13 were over 8 years of age); moreover all but one of the patients were resident in the city. The evidence of widespread infection of human beings with bovine bacilli in England and Scotland furnished by this inquiry is corroborated by recent bacteriological investigations of other forms of human tuberculosis—namely, cervical gland, bone and joint, and genito-urinary tuberculosis, in which high bovine percentages have been found. Reports of these investigations are in preparation.

TABLE I

Proportion of Human and Bovine Infections in Different Localities *

Locality.	Sender.	Cases.	Human.	Bovine and per cent.
Aberdeen ..	Dr. J. Smith.	15	8	7 (47)
Dundee ..	Dr. W. T. Munro.	12	8	4 (33)
Fifeshire ..	" "	6	4	2 (33)
Ayr	Dr. J. Grant.	4	2	2 (50)
Newcastle-upon-Tyne ..	Various hospitals.	13	13	0
Leeds ..	Dr. W. Vining.	66	48	18 (27)
City ..		*49*	*39*	*10 (20)*
Rural ..		*17*	*9*	*8 (47)*
Hull	Various hospitals.	4	3	1 (25)
Sheffield ..	Dr. E. Williams.	9	6	3 (33)
Manchester ..	Dr. G. D. Dawson.	14	12	2 (14)
Liverpool ..	Drs. W. E. Crosbie and C. Rundle.	10	8	2 (20)
Lancs (rural) ..	Ministry of Health.	1	0	1
Staffordshire ..	Dr. J. Menton.	5	2	3 (60)
Wolverhampton	Dr. S. C. Dyke.	9	8	1 (11)
Bristol	Dr. A. D. Fraser.	5	4	1 (20)
Gloucestershire.	Dr. E. N. Davey.	3	3	0
Kent	Drs. Greenwood and Constant Ponder.	35	26	9 (26)
Lincs (rural) ..	Ministry of Health.	1	0	1
Cornwall ..	" "	1	1	0
London ..	Dr. D. Nabarro.	5	4	1
		218	160	58.

* Including the 30 reported in 1932.

As will be seen from Table I. the proportional frequencies of bovine infections in tuberculous meningitis are in general higher in Scotland than in England.

The cases from Fifeshire and Dundee were examined by Dr. W. T. Munro, to whom I am much indebted for cultures of the bovine strains and for allowing me to include the results he has obtained down to October, 1933. The Aberdeen cases included three in persons who were not residents of the city. One, a youth of 15, was a native of the Orkney Islands; the type of bacillus in his case was the bovine. One of the patients came from the Shetland Islands and one from Elgin; these were both human infections. The remaining 12 cases were residents of Aberdeen and of these six were due to human and six to bovine bacilli. The four Ayrshire cases were in persons ranging in age from 16 to 22 years.

The total number of Scottish cases examined is 37, of which 15, or 40·5 per cent., were caused by bovine bacilli. In England 214 cases (151 recent and 63† from earlier series) have now been examined and of these 52, or 24·3 per cent., were bovine infections. Tuberculous meningitis in Scotland thus falls into line with all the other forms of human tuberculosis in showing a higher bovine percentage than the respective forms of the disease in England.

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† Only 30 of these included in Table I.

While in Scotland the bovine percentages for the different localities were high and showed little variation, in England they have varied widely, from 0·0 per cent. in Newcastle-upon-Tyne to 60·0 per cent. in Staffordshire. The figures for the cities and towns must not however be taken to represent the actual proportional incidence of bovine infections on the inhabitants of these places. On ascertaining the home addresses of the patients it was found that many were not residents, having been sent into the city hospitals from neighbouring small towns or villages, or from the outskirts of the cities, and that these rural or suburban cases were due in higher proportion to bovine bacilli than were the city cases.

The bovine case from Hull was in a child of 6 years, who until a few weeks before death had lived in a village in the East Riding of Yorkshire where his father worked on a farm.

One of the Sheffield bovine cases came from the neighbouring town of Chesterfield. The Liverpool and Manchester cases were from the suburban districts of these cities. Of the Manchester cases one, a child of two, had been fed on raw milk. The milk of the producer-retailer who supplied the household had been tested three months previous to the death of the child and found to contain tubercle bacilli. The second case from Manchester was a girl of 18 years. The tuberculosis in this case was of some standing, the mesenteric glands showing calcified lesions. The Bristol case was from a village in Gloucestershire and is one of the two referred to under autopsies in which the oldest and only glandular lesions were in the thorax. The London case was in a child aged 22 months, who had been sent in for treatment from a small town in Essex.

The 66 Leeds cases (1930 to 1933), for which I am greatly indebted to Dr. Wilfred Vining (professor of children's diseases, University of Leeds) and to his various house physicians, are subdivided in Table I. into city and country cases, the latter coming from small towns and villages in the West Riding of Yorkshire. Of the 49 residents 39 were infected with human and 10 with bovine bacilli. Of the 17 cases in non-residents nine were due to human and eight to bovine bacilli. In one of the latter cases, the source of the bovine bacilli could not be traced in the West Riding and it was thought that the child was infected on a visit to Wallsend, near Newcastle-upon-Tyne. Assuming this to have been so the percentage of bovine infections for the country districts of the West Riding is 43·75.

The cases from the country districts of Kent have also yielded a high proportion of bovine infections. Through the courtesy and kind coöperation of Dr. A. Greenwood and Dr. Constant Ponder I have been able to examine 35 cases of tuberculous meningitis from Kent. Of these, two were in persons who were not residents of the county. Omitting these two there are left 33 cases of which nine, or 27·3 per cent., were due to bovine bacilli. Twenty-four of the persons were under 16 and of these eight, or 33·3 per cent., were bovine infections. At one stage of the inquiry (in 1932) the percentage of bovine infections in Kent children was 50, but a sequence of cases due to human tubercle bacilli towards the end of 1933 has reduced it to 33·3.

From the country and small urban districts of North Staffordshire five cases have been examined and here also the proportion of bovine infections was high. Of the five cases three were due to bovine and two to human bacilli. The persons infected with bovine bacilli were two children aged 19 months and 2 years and a woman of 22. The woman lived on a farm where there were tuberculous cows and the first of the two children had been supplied with milk from a source from which a positive sample had been taken four months previously.

Age and Sex Frequency

For the purposes of this section the 63 cases previously reported are included. There are thus 251 cases available for statistical analysis.

Sex.—The sexes of the patients were given in 247 cases. Of this number 131 were males and 116 were females. The males were preponderant in the first five years of life and in adult age. In the age-period 5–14 years the females equalled the males. In adolescence the females exceeded the males. Of the males 38 (29·0 per cent.) and of the females 28 (24·1 per cent.) were infected with bovine bacilli.

Age.—In Table II. the cases have been analysed to show the relative frequency of human and bovine infections in each of the first seven years of life and at age-periods 0 to 4, 5 to 14, 15 to 24, 25 and over, and at all ages. The ages of two cases in an earlier series were not recorded. These cases, infected with human bacilli, are included in the all ages group only.

TABLE II

Age-incidence of Human and Bovine Infections

English and Scottish figures combined

Age-periods.	Cases.	Human.	Bovine and per cent.
0–1 years ..	20	17	3 (15)
1–2 ,, ..	25	15	10 (40)
2–3 ,, ..	24	13	11 (46)
3–4 ,, ..	26	20	6 (23)
4–5 ,, ..	20	14	6 (30)
5–6 ,, ..	20	14	6 (30)
6–7 ,, ..	10	4	6 (60)
7–14 years ..	56	48	8 (14)
15–24 ,, ..	38	28	10 (26)
25 and over ..	10	9	1 (10)
0–4 years ..	115	79	36 (31)
5–14 ,, ..	86	66	20 (23)
15–24 ,, ..	38	28	10 (26)
25 and over ..	10	9	1 (10)
Total ..	251*	184*	67

* Including two cases age not stated.

In the first year of life the percentage of bovine infections is comparatively low—namely, 15·0—probably because unheated cow's milk is not usually given to babies. After one year the percentage bovine rises sharply to 40·0 in the second and 45·8 in the third year. In these years cow's milk is frequently consumed in the raw state. In the fourth year the percentage falls to 23·1, or about half what it was in the third year, and in the fifth and sixth years rises slightly. The high percentage figure in the seventh year may be fortuitous, as it is based on a small number of cases. In late childhood (7–14) the percentage incidence falls to 14·3 and rises again during the period of adolescence. The adolescent figure 26·3 is nearly as high as that—namely, 27·3—for the ages 3 to 5.

The infection in two of the adolescent cases was evidently acquired several years before the fatal issue and it is probable that a high proportion of the older children and adolescents were infected in early childhood.

Summary

1. The results are given of typing the strains of tubercle bacilli obtained from a new series of 188 cases of tuberculous meningitis collected during the period from December, 1931, to December, 1933.

2. Of this number 48 (25·5 per cent.) were due to bovine bacilli and 140 (74·5 per cent.) to human bacilli.

3. The cases were derived from widely separated localities in England and Scotland. The number of English cases was 151, of which 33 (21·8 per cent.) were bovine infections. The number of Scottish cases was 37; of these, 15 (40·5 per cent.) were due to bovine bacilli.

4. Including the 63 cases previously reported the total number of English cases investigated is now 214. Of these, 52 (24·3 per cent.) were caused by bovine bacilli and 162 by human bacilli.

5. The percentages of bovine infections at different age-periods (English and Scottish figures combined) are as follows: 0 to 4 years: *31·3*; 5 to 14 years: *23·3*; 15 to 24 years: *26·3*; and 25 years and over: *10·0*.

6. The bovine cases were widely distributed and varied greatly in proportional frequency in different localities, country places and small towns, in general, giving higher percentages than the cities.

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PELLAGRA IN SUDANESE MILLET-EATERS

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In May, 1933, I encountered symptoms unfamiliar to me in a desert community of Arabs at Abu Deleig in the Butana Desert of the northern Anglo-Egyptian Sudan. It was apparent that these people were suffering from a considerable degree of avitaminosis. In June 103 members of the tribe were examined, their medical histories were recorded, and their individual diets were assessed.

It became obvious that the community was pellagrous and it appeared that most of its members were in a state of disease, proclaimed by certain physical signs, suggesting that the pellagrous process has a phase preceding subjective manifestations, a phase of activity in which such manifestations dominate the picture, and a post-active phase in which a measure of more or less toleration to the process has been evolved. The staple diet was found to be millet. W. H. Wilson (1921) has recorded pellagra in millet-eaters in Egypt and two cases have been recorded from the Sudan in an annual report of the Sudan Medical Service (1929). In the past it has been usual to ascribe the "absence" of pellagra from the Sudan as due to the millet diet of its inhabitants as compared with the maize diet of most Egyptians.

I use the term pellagra in reference to the symptom-complex which is commonly found associated with the dermatitis which has itself occasioned the more classical conception of pellagra as a predominantly skin affection. In this I follow the guidance of Manson-Bahr (1925). Last November, through the kindness of Dr. D. Riding, of the Public Health Department, Cairo, I was introduced to Dr. H. W. Dudgeon and Emeritus Prof. W. H. Wilson, who very kindly demonstrated a series of male and female pellagrin inmates of the asylums at Abbasia and Khanka near Cairo. The same fundamental process was found in the pale maize-eating Egyptians as in the darker millet-eating Sudanese, but in the former the skin symptoms were severer and no blue or black patches on their gums or tongues were to be found.

For the purposes of my inquiry the 103 individuals were divided into four clinical groups: those with severe active pellagra (all women), those with less severe active pellagra (all men), those with what I considered to be latent pellagra (all men), and those whose condition would not have suggested pellagra if divorced from the circumstances (all boys). A fairly strict purdah tradition prevented my seeing any young girls. The groups of men were then pooled and re-analysed into three new groups according to whether they drank milk daily, less than daily in the average week, or not at all in the average week. The percentage incidence of active pellagra was then estimated for each of these milk consumption groups. Lastly, data relating to cases of mental disorder in males and females of the affected tribe were collected.

The present paper gives a summary of the findings and an outline of the views based on them. A more complete account of the observations will be published later.

FINDINGS

Certain physical signs were common to most adults of the community but were more pronounced and more frequently found in multiple association in those with subjective symptoms and considered to be suffering from active pellagra.

These signs were "sulphur-flake" sebaceous dysfunction on the forehead, wings of the nose, cheeks, and chin; a stomatitis characterised by the pronounced impression, as if in wax, of the lateral aspects of the closed rows of teeth on the mucous membranes of the cheeks (hereafter called the buccal frieze*); glossitis of various forms (fissures, rawness, blueness, blue, black, or dark red patchiness, and in very many a stippling at the tongue margins in blue, black, or dark red); blueness or blackness of the gums in patches or to complete involvement; and in certain subjects a deepening of the natural pigmentation on the forehead and cheeks.

The commonest subjective symptom was a burning pain in the hands, feet, head, and interscapular region. This pain came at night or on going into the shade after being in the sun. It came daily in the hot dry season "when the sun went down." In the rainy season it disappeared. Some subjects got it at seasons other than the hot dry season if they "worked hard," "rode a camel," or "got tired." It was often associated with "swelling of the skin" followed by desquamation. Other common symptoms were a gnawing or "hot" pain in the epigastrium (as characteristically present as the burning pain in the extremities, both generally being present together), weakness, wasting, flatulence (very common), vomiting, diarrhœa (often bloody), joint pains, lumbago, formication, vertigo, sleep dysfunction, and mental disorder.

Certain cases of asthma, paroxysmal rhinorrhœa and dietetic intolerance, and such histories as that of a pellagrin who said that always after a shower of rain for about half an hour "the skin of all his body felt swollen," suggested an allergic factor.†

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* I have noted a similar appearance in a much lesser degree in Europeans, Hamites, Semites, and Negroids, in all of whom pellagra could not be said to be obviously present. Is it a sign of vitamin-A deficiency?

[illegible] l out a series of skin tests on pellagrins [illegible] of them the condition of factitious [illegible] asioned, and further, that they were [illegible] on and whole-millet. These investi- [illegible] elsewhere.

Variable knee-jerks and spinal tenderness suggested the clinical entity of subacute combined degeneration. The mental cases comprised maniacs and melancholiacs, mostly the latter. In a high proportion of them there was amelioration in the rainy season and recurrence or exacerbation in the hot dry season. *Among 13 female cases 7 (of whom 5 were brides)* committed suicide. Among 14 male cases 1 had committed suicide and 3 had attempted to do so. The more severe the pellagra the less was the incidence of dental caries. It is therefore of interest to note that the teeth of the modern Egyptians are proverbially good; it has been claimed that most of them are pellagrins.

Of interest, but less commonly noted, were: deprivation or abstinence symptoms relating to coffee and millet, tenderness of the calves without œdema or cardiac dysfunction, tongue tremor, stammering, night-blindness, ptosis, and various urinary affections of an undetermined nature. Eye affections existed but no diagnostic attention was paid to them owing to lack of time.

Statistically and clinically, women were found to be more severely affected. The disease occurred in the first decade, was most common in the third decade in both sexes, and became in a proportion of male cases later in life more or less quiescent or inactive. Occupation was a factor inasmuch as it governs insolation and accessibility of the milk-supply. Insolation daily was estimated for each person examined and, although exposure to the sun was associated with dermatitis and the burning pain which came on in the shade or darkness after exposure, yet the group with severest pellagra—the women—averaged only 1·7 hours exposure daily as compared with 6·7 and 7·0 in the male groups, the less severely pellagrous The first group, incidentally, may be presumed to have photosynthesised vitamin D to a much lesser degree than the two male groups. Certain pellagrous manifestations appear to have been activated from latency by katabolic acceleration in the form of "fatigue"—i.e., exercise or labour, malaria, and viperine poisoning.

The hot dry season was the period of maximum occurrence, recurrence, and exacerbation of symptoms.

There were found to be, also, significant curves on a graph on which were plotted the quarterly figures for deaths and conceptions (antedated births). There was a peak of deaths in the rainy season which immediately follows the hot dry season, the period of maximum pellagra activation. This is interpreted as showing that a pellagrous community after its seasonal affliction is especially susceptible to the infective diseases associated with the rainy season, the period of maximum microbic and insect activity. A very marked depression in the conception curve was present in the hot dry season, and as it cannot have been due to vitamin-E lack, for the amount of millet consumed if anything increases in this season, it must be ascribable either to vitamin-A lack or to the essential pellagrous process.

As extremes of cold and humidity, as well as sudden changes of temperature and humidity, also occasioned pellagrous manifestations (cf. activation of allergic phenomena in common experience) I consider that the seasonal factor may be included in a wider conception, which is atmospheric crisis, by which is meant extremes or rapid changes of temperature and humidity.

The food of paramount importance to this community for both quantity and quality—i.e., vitamin value—is milk. In its comparative absence in the hot dry season it appears that the cereal toxamins of Mellanby (1932) have optimum conditions for exerting their effects. It was found that in the most severely pellagrous group coffee consumption was highest, and it is therefore of interest to note that intolerance to coffee has been recorded by Lickint—i.e., coffee is a potential allergen. The consumption of meat and green vegetables amongst these natives was almost negligible. Many of them in the hot dry season eat nothing but whole-millet. The variety is *Sorghum caudatum*, Stapf, *var. feterita*, a miserable white or cream grain of recognised poor food value. A neighbouring Arab tribe, the Shukria, who eat mainly a bigger grain of a yellow to orange colour, *Sorghum durra*, Stapf, are known to be less severely pellagrous.

W. H. Wilson (1921), utilising a table published by Thomas (1909), has shown that, in pellagrous diets, the biological protein value (B.P.V.) is below the critical value of 40 to 45 g. per diem. The daily averages for all groups in Abu Deleig were below this figure. Certain histories suggested that millet, coffee, and milk might serve as allergens in pellagrins. Samples of the local well waters were taken for analysis and found to be high in calcium content.

DISCUSSION

Impressive findings were that there was an allergic factor involved deriving from the food, that pre-active, active, and post-active phases of the disease existed; that in the hot dry season, the period of maximum active pellagra and intensest insolation, the population was practically deprived of its vitamins A, the postulated B_2 and C, and also of its food source of vitamin D and cholesterol; and, lastly, that in this season also the B.P.V. of a diet fell below the critical value of 40 to 45 g. daily—*meaning that* some persons were living on their own cell-protein, and that others on the borderline might have to do so in the event of increased katabolism demanding extra nitrogen utilisation. In the circumstances it has seemed not unreasonable to add yet another to the numerous theories of pellagra, none of which has explained all the phenomena associated with the disease.

No place has been found, in my theory, for water-soluble vitamin B_2. Its existence has been postulated on laboratory findings in monkeys and rats and on the therapeutic effects of diets in pellagrins. It has not been isolated and no evidence as to its chemical nature has been put forward. Further, the existence or otherwise of phytosterol, cholesterol, and ergosterol in B_2-free diets used for laboratory experiment is not always clear. One or more of these three substances *is to be found in all diets on which pellagrins* have improved; milk, meat, liver, green vegetables, and yeast are ready examples.

The fundamental condition in pellagra is, in my opinion, one of multiple avitaminosis and cholesterol-lack. The vitamins primarily concerned are the fat-soluble A and D; a lack of C is contributory. The action of cereal toxamins is thus permitted to add the signs and symptoms of their effects to those *associated with deficiency of the vitamins.*

Lack of vitamin A may be held to account for impairment of the integrity of epithelial surfaces, thus conducing to the entry to the blood stream of potential allergens: foreign protein substances, from the mouth, stomach, and intestine. Deficiency of vitamin C as it impairs capillary walls may also be considered to facilitate allergic manifestations. Lack of cholesterol, phytosterol, and ergosterol in the food, concomitantly with *vitamin D, means that if this* latter is to be obtained by the tissues, cholesterol must either be synthesised in the body or mobilised from the body's store; this exists most notably in the brain, spinal cord, gonads and adrenals.

Vaughan, quoted by Clark (1932), has claimed that whenever protein is broken down there is liberated a protein poison, which is soluble in alcohol, diffuses through membrane, and on injection into a dog produces anaphylactic phenomena. The B.P.V. of pellagrous diets implies that cell-protein is broken down, and thus Vaughan's soluble protein poison is presumably available as a potential allergen in pellagrins.

If, now, the medley of signs and symptoms embraced by the term pellagra be considered, it will be seen that most of them can be ascribed to one or other of the factors detailed above. To lack of vitamin A may be ascribed stomatitis, possibly glossitis, gastritis (dyspepsia), enteritis, bladder affections, vulvo-vaginitis, the preputial affection described by Stannus (1911–12), night-blindness, sterility and, indirectly through toxamin effects, subacute combined degeneration. Further, it contributes to the causation of allergy. (It is of interest that allergy exerts its effects impressively on skin and mucous membrane, the epithelial tissues and those on which vitamin-A deficiency works havoc.) Vitamin-C deficiency appears to be responsible for the discoloration of the gums and possibly also of the tongue. It may also be to blame for tenderness of the calves and certain joint affections.

To lack of vitamin D and consequent mobilisation of the body-cholesterol may be ascribed headache, vertigo, formication, irritability, epilepsy, mania, melancholia, sleep dysfunction, sexual dysfunction, pigmentation abnormalities and subacute combined degeneration. (The exact relationship between toxamin effects and the fat-soluble vitamins is not clear.) Pathological findings in pellagra are notably present in the central nervous system, in the gonads, and in the adrenals. Writers quoted in the Medical Research Council's report for 1932 have shown that vitamin D may be prepared from highly purified crystallised cholesterol obtained from brain tissue.

To quantity-starvation—i.e., a low B.P.V.—may be primarily ascribed wasting, for the pellagrin has to use up first of all his body fat; thereafter demands on his cell-protein will account for a state of active or potential allergy. Allergic manifestations have been claimed above to depend upon atmospheric crisis; to this may now be added actinic and tactile trauma.

It is well known that the dermatitis of pellagra, while very obviously affecting the areas of the body exposed to the sun, also affects "pressure points"—i.e., places of tactile stimulus, such as the elbows and the knees. I noted with interest that the Egyptian pellagrins in Cairo were affected on the knees, elbows, buttocks, and over the trochanters: one of them who had attempted suicide some time before bore the pigmented trace of the rope and knot round his throat. That a similar or common process is at work in Addison's disease readily suggests itself. In short, in pellagra tactile stimuli, particularly if repeated, may induce manifestations of reaction.

Wright quotes the experiments of Lewis on the response of skin by a state of factitious urticaria to heat, cold (extremes and rapid variations), and touch; a causative vaso-dilatory substance of a histamine-like nature, known as H-substance, being postulated. It has been suggested that the reaction of the skin to light trauma by redness, desquamation, pigmentation, and increased reaction after six months, described by Finsen, is of a similar nature and also due to H-substance. It seems, further, that this H-substance may be the soluble protein poison of Vaughan. The dermatitis of pellagra seems to have everything in common with these phenomena.

The dermatitis of pellagra is an allergic response to light and tactile trauma and the pigmentation is protective. Allergens are known to vary in allergic power—certain pollens as compared with others, for example—and it seems reasonable to assume that response to trauma will be greater in those in whom greater allergen content is circulating in the blood. From this it seems natural to find that, as a rule, the more severely ill a pellagrin is the more severe are his skin symptoms. That pigmentation is protective is suggested by several facts.

Some Sudanese pellagrins who said that they once upon a time suffered from the characteristic burning pain of the extremities but had not done so for several years were appreciably darker than their fellows and some of them had a very definite deepening of pigmentation on the forehead and cheeks. Secondly, the women pellagrins at Abu Deleig, who are strikingly pale as compared with the males, were very much more severely ill. Thirdly, among these Sudanese cases the palms and soles and sides of the palms and soles, and not the dorsal aspects, usually showed burning and desquamating: the palms and soles of the Sudanese are much paler than are the dorsal aspects of their hands and feet. Fourthly, the Egyptian pellagrins were very much more ill than were any of my Sudanese cases and they were much paler. Further, on the sites where the dermatitis had completed its active phase and the scabs were falling away, I was astonished to see that there was no appreciable residual pigmentation in the skin beneath (the scabs were pigmented, of course). Were these Egyptians so severely ill because they could not deposit permanent protective pigment?

The rôle, if any, of photosynthesised vitamin D in pellagra has not yet been discussed. That it does play a part is suggested by the facts that the blood-calcium is increased in pellagrins and that the severer the disease the less the dental caries. In other words, there is possibly an unusual photosynthesis of this vitamin in progress. Hou, quoted by the Medical Research Council (1932), has shown that birds derive vitamin D from the sebaceous preening gland. In pellagra the sebaceous glands hypertrophy (or at any rate their orifices do) and pour forth a yellowish secretion on the surface of the skin; this secretion has been aptly likened to sulphur-flakes. Prof. Wilson, of Cairo, demonstrated to me that if a microscope slide was drawn down the nose of a pellagrin, the sulphur-flakes would powder away and no greasy smear would be left on the slide, as was the case with a slide drawn down the nose of a non-pellagrin. This, in addition to being a useful clinical aid, suggests that the sebaceous glands are an important site of vitamin-D manufactured from mobilised body cholesterol; the photosynthesised vitamin D being used up almost immediately it is made and the sulphur-flakes being the non-fatty by-products or residuum; normally sebum is rich in cholesterol and fats.

That vitamin D is an antidermatitis vitamin may be read into the fact that the burning pain of pellagra, which is presumably a phase of the dermatitis, comes on when a subject enters the darkness after being exposed to light, the suggested explanation being that when vitamin D is so lacking through its absence from the food, as also are cholesterol, phytosterol, and ergosterol, what little can be produced from body sources is probably immediately utilised in countering sun-trauma. The effects of this, however, are more lasting, and thus come into conscious appreciation in the dark when sunlight is no longer available to continue the frantic manufacture of minute but effective quantities of vitamin D.

It would be only natural that a vitamin manufactured in the skin should have a special relationship to the health of the skin, and I suggest that vitamin D is the antidermatitis and possibly also an anti-allergic vitamin. There are no data suggesting its mode of action except that the blood-calcium is raised in hypervitaminosis D (as in pellagra) and thus may conduce to the control of allergic phenomena.

It seems that pellagra on diets other than cereal diets, in cases of gastro-intestinal disease and in the alcoholic (who has a lessened appetite and an impaired gastric mucosa), may be explained by the fact that the entrance of allergens to the blood from the alimentary canal and from cell-protein broken down to maintain the nitrogen balance, is to be expected. Given a degree of vitamin-lack, particularly vitamin-D lack—and here the question of adequate insolation in prisons, asylums, and poverty is of interest—there is then wanting only atmospheric crisis and sun trauma for pellagrous manifestations to develop. In England, cases occur in the bright sunshine of spring after the dull, sunless winter, a period of vitamin deprivation. In the Sudan the fierce insolation, the vitamin deficiency, and quantity-starvation all occur together.

The importance of maize in the history of pellagra seems to be explainable by two things. First, maize, after oats, has the highest toxamin value among cereals and therefore will require a bigger amount of the fat-soluble vitamins to keep its evil effects in abeyance than will millet and wheat. Secondly, maize is the staple diet of vast populations living in subtropical and tropical areas where a hot, dry season results in vitamin deprivation, semi-starvation, and actinic trauma for a period of four to five months a year. The rôle of maize is thus incidental, while at the same time the Italian insistence on its containing a toxic factor is vindicated.

In conclusion, certain points of anthropological interest emerge. One is that, as women are more severely affected than men, a pellagrous tribe that is endogamous tends to extinction, preceded possibly by polyandry, or to become exogamous. Another point is that the vulvo-vaginitis and preputial dermatitis of uncircumcised pellagrins (cf. the cases of Stannus in Nyasaland) are possibly greater factors *in the origin, spread, and popularity* of male and female circumcision than are the magico-religious mechanisms usually advanced in explanation. As usual, the fact is more important than the belief.

SUMMARY

(1) Pellagra in a Sudanese community of millet-eaters is described. From 103 individuals data were collected relating to occupation, diet, sun-exposure, medical history, and present condition.

(2) The following facts emerged: (*a*) In the period of maximum incidence of pellagra, the hot, dry season, the community's main protein, cholesterol and vitamin supply (which is its milk) sinks to a practical deprivation; millet alone remains as a food item. (*b*) An allergic factor is present in pellagra. (*c*) The severer the pellagra, the less the degree of dental caries. (*d*) Objective signs of the dermatitis of pellagra in these pigmented Sudanese are rarely appreciable.

(3) In a new theory of the causation and nature of pellagra it is suggested: (*a*) that the fundamental condition is a lack of cholesterol and vitamins A and D in the food, lack of vitamin C being a contributory factor; (*b*) that pellagra is largely allergic and that the evils resulting from cholesterol and vitamin-deficiency contribute to the syndrome, as do also cereal toxamin effects; (*c*) that pigmentation is protective against the actinic and tactile traumata affecting the skin of pellagrins; (*d*) that vitamin D, and not the hypothetical water-soluble vitamin B_2, is the anti-dermatitis vitamin.

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THE PRACTICAL TREATMENT OF RICKETS IN CHILDREN *

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In the concluding paragraph of a recent report to the Medical Research Council, Spence[1] suggests that "there are sufficient cases of human rickets in the big towns living under conditions which are suitable for comparative therapeutic tests of antirachitic substances." The following observations made in 1929 are therefore submitted in the belief that they may still prove of value to investigators in this field.

The difficulty then experienced seems to be intensified to-day—namely, the assessment of the potency of the many antirachitic preparations and agencies available. It was observed that rickets cases even while in hospital were receiving more than one preparation, were exposed to sunlight, and, in addition, were placed under ultra-violet lamps. The results, albeit excellent, could not be attributed to any one agency. It was decided, therefore, to run parallel series of cases employing different "curative" agencies with controls on the lines of biological experiment.

Beds were allocated in Woodend Municipal Hospital, and rickety children were received from the child welfare clinics under the direction of the maternity and child welfare officer for the city of Aberdeen. Little difficulty was experienced in selecting suitable cases in children from two to three years of age exhibiting gross rickets. The predominant type in Aberdeen was the fair, plump, soft child, with square head and thickened epiphyses. Beading of the ribs was common but craniotabes rare. The most obvious deformity was seen in the lower limbs, all degrees from bowing to sharp angulation being observed in the cases selected. Greenstick fractures of the radius and ulna were common.

X ray appearance.—Each child was radiographed on admission, the appearances of the tibia and fibula being taken as an index of rickets. These bones were selected in preference to the radius and ulna since deformity could be noted as well as the acuity of the disease. Most of the cases belonged to Bromer's[2] second or active type. Broadening of the rarefied diaphyses was seen, and in the older children compensatory periosteal thickening of the distal end of the shaft ("beaker" type of Gottsche). The epiphyses were shadowy and ill-defined. Under successful treatment the osteoid layer thickened, producing the typical cuff (manchette), the epiphyses became distinct, and ultimately the clean-cut outline of normal bone was taken as evidence of cure.

For *classification* purposes three grades of severity of rickets were recognised.

R. 1 (mild), where the diaphyseal line was blurred and slightly broader than normal, with a corresponding lack of sharpness of the epiphyseal centre.

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* In part communicated in a paper read to the Association of School Medical Officers of Scotland, Aberdeen, June 3rd, 1933.

R. 2 (moderate), where there was distinct broadening of the diaphysis with an indistinct or wavy outline, combined with rarefaction of the shaft and an indistinct epiphysis.

R. 3 (severe) when the diaphysis was blurred, "cupped," or appeared "frayed out" and the epiphysis not seen at all.

The degree of deformity was similarly designated.

D. 1 (mild). Showing slight uniform bowing of the shaft.

D. 2 (moderate). Marked uniform bowing.

D. 3 (severe). Showing sharp angulation or twisting.

FORMS OF TREATMENT COMPARED

The experiments were made during the winter months and all natural ultra-violet radiation was excluded from the children, who were confined to bed in a special ward. The following daily diet was strictly adhered to in all the groups: porridge with cream, toast, cocoa with milk; soup, mince and potatoes, milk pudding with cream; bread, toast or biscuits, with milk or cocoa; warm milk. Fresh fruit was allowed.

Controls.—The ten rickety children selected received the above diet only, and were excluded from all ultra-violet radiation. The general condition of the children improved greatly, but skiagrams taken at the end of four, six and eight weeks revealed little, if any, change in the appearance of the bones.

Ultra-violet irradiation.—A similar series (seven cases) were exposed to the radiation of carbon-arc lamps. The output of these lamps before and after the course of treatment was 80–140 units according to the resistance employed as measured by the photoelectric method.[5] The power at normal setting of the control resistance was 90 units, which corresponds to the production of a first degree erythema in 4·2 minutes at three feet distance for unpigmented skin in an adult of average sensitivity. Graduated daily exposure with a maximum of 20 minutes at five feet was adopted. Subsequent radiograms showed that in most cases cure was effected within four weeks and in all cases at the expiry of eight (Table I.). The outlines of the bones were clean-cut and decisive.

TABLE I.—*Effects of Ultra-violet Irradiation on Severity of Rickets*

No.	Age.	Date in 1929.	Before and after treatment.				
			Class.		Date in 1929.	Class.	
			R.*	D.*		R.	D.
1	2 4/12	April 9th.	1	3	May 20th	0	3
2	2 2/12	May 21st.	3	2	July 1st.	0	2
3	2 2/12	,, 24th.	3	2	,, 1st.	0	2
4	2 5/12	Feb. 3rd.	3	0	March 20th.	0	0
5	2 6/12	April 12th.	2	2	May 21st.	0	2
6	1 8/12	,, 9th.	3	1	,, 20th.	0	1
7	2 2/12	August 8th.	4	2	Oct. 11th.	0	1

Class. = classification.
R* 1, 2, 3 = degree of severity of rickets. D* 1, 2, 3 = degree of deformity.

Quartz-mercury vapour lamps were equally effective using similar dosage as measured by erythema or by the photoelectric cell, but carbon-arc lamps were preferred since their ultra-violet ray output remained more constant throughout the period of the experiment; also many children could be exposed simultaneously to one lamp.

Cod-liver oil was administered to five children. The oil was obtained locally. The producers gave the vitamin-D content to be 200 units of antirachitic activity per gramme as measured by the "line" test.[4] One drachm was given per day, no difficulty being experienced in getting the children either to take or tolerate it. Radiograms showed satisfactory healing within six weeks in most instances (Table II.), but the results were not so clear as those which were obtained by ultra-violet irradiation.

TABLE II.—*Cod-liver Oil*

No.	Age.	Date in 1929.	Before and after treatment.				
			Class.		Date in 1929.	Class.	
			R.	D.		R.	D.
8	2 4/12	August 20th.	3	2	Oct. 11th.	1	2
9	4 5/12	,, 2nd.	4	3	,, 11th.	1	3
10	2 8/12	,, 27th.	2	1	,, 11th.	0	1
11	3 4/12	Oct. 15th.	1	2	Dec. 10th.	0	2
12	2 11/12	,, 29th.	1	0	,, 10th.	0	0

Vitamin-D product I.—This was a proprietary preparation originally derived from cod-liver oil; but later, in 1929, a preparation of irradiated ergosterol was marketed under the same name. The latter product was used in the work here described. The full daily dose ♏4 as given to six children purported to be three times as active as one drachm of cod-liver oil. The results, given in Table III., were frankly disappointing.

TABLE III.—*Vitamin-D Product I*

No.	Age.	Date in 1929.	Before and after treatment.				
			Class.		Date in 1929.	Class.	
			R.	D.		R.	D.
13	2 5/12	May 24th.	1	0	August 2nd.	1	0
14	2 4/12	,, 8th.	3	1	June 17th.	2	1
15	4	June 25th.	1	3	August 29th.	1	3
16	1 6/12	May 21st.	1	0	,, 2nd.	1	0
17	2 5/12	Jan. 15th.	3	1	March 2nd.	1	1

Vitamin-D product II was similar to vitamin-D product I, but by the addition of malt, fruit juice, &c., contained also the accessory vitamins A and C. Skiagrams showed this product to resemble closely vitamin-D product I in its efficacy.

Vitamin-D product III was an irradiated ergosterol product and was given to seven children. The full daily dose given corresponded to half an ounce of cod-liver oil as regards vitamin-D potency. The results are shown in Table IV. It will be observed that these were generally severe cases of rickets and that the ergosterol was not administered for much longer than one month since the ward was in demand and it was desirable to heal the cases quickly. Accordingly, as in the other groups the unhealed case received four weeks' course of ultra-violet ray treatment and in every instance cure was effected. The results of the irradiated ergosterol group, however, were at such variance with

TABLE IV.—*Vitamin-D Product III*

No.	Age.	Date in 1929–30.	Before and after treatment.				
			Class.		Date in 1930.	Class.	
			R.	D.		R.	D.
18	3 1/12	1929. Nov. 12th.	1	3	Feb. 1st.	1	3
19	2	1930. March 5th.	3	2	April 10th.	3	2
20	2	,, 6th.	2	1	,, 10th.	2	1
21	1 10/12	,, 6th.	3	2	,, 10th.	2	2
22	2 2/12	,, 10th.	3	3	,, 22nd.	3	3
23	3 6/12	,, 17th.	3	3	,, 22nd.	3	3
24	2 1/12	,, 18th.	3	1	,, 22nd.	3	1

those reported by other workers, such as Hess,[5] that several samples were tried out on rats by Mr. H. D. Griffith of the natural philosophy department of Aberdeen University. From his experiments he concluded that "the sample of ergosterol used was either incompletely activated or it had lost its activity subsequent to preparation." In one group the rats had actually received daily a dose equivalent to a daily dose of 13 tablets to a babe, with no demonstrable effect.

Cost of treatment.—If the vitamin-D products had proved efficacious, the cost of treatment would have been as follows : Cod-liver oil, 4*d.*, vitamin-D products I and II, 8*d.* each, and vitamin-D product III, 1*s.* 8*d.*, for the full course.

After results.—In June, 1933, the cases treated in this series were reviewed, and of 27 children 4 could not be traced and one had died of pneumonia. The remaining 22 showed permanently healed rickets with fully corrected deformities as regards the lower limbs. Four of these were said to have been exceptionally healthy since discharged from hospital. Four others had not enjoyed good health, the disabilities reported being acute mastoiditis, corneal ulceration, and general debility.

CONCLUSIONS

(1) When once developed rickets requires more than an adequate diet to ensure an expeditious cure. (2) In ultra-violet therapy we have a rapid curative agency, the artificial variety (e.g., carbon-arc lamp) being especially suitable for clinics and institutions. (3) A reputable brand of cod-liver oil is probably the cheapest effective substance and one which lends itself to domiciliary administration in the cure or prevention of rickets. (4) Regarding the many expensive preparations of the "potted alphabet" type, which doubtless to-day contain their quota of antirachitic units, it is suggested that a preliminary trial *in children* such as has been described, should be made before employing them on a larger scale. (5) I may add that although deformities may ameliorate under treatment, surgical intervention is advisable for the grosser forms and should not long be delayed.

Grateful acknowledgment is made to Dr. J. A. Stephen, maternity and child welfare officer, Aberdeen, for his invaluable coöperation throughout, to Mr. H. D. Griffith, Aberdeen University, who conducted the animal experiments and assessed the U.V.R. output of the lamps, and to Dr. H. J. Dawson, school medical officer, Aberdeen, who collected the cases for review.

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CLINICAL AND LABORATORY NOTES

TWO CASES OF MENINGITIS DUE TO BACILLI OF PFEIFFER TYPE

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MENINGITIS due to organisms of the Pfeiffer type is by no means common in this country. Hence it has been thought worth while to place on record two cases in both of which recovery ensued.

DR. DYKE'S CASE

The patient was a male aged 22. A radical mastoid operation was performed in 1928; since then the health had been good. On May 6th, 1933, while at a football match he became conscious of a profuse watery discharge from the left ear; he mopped it up from time to time with his handkerchief but otherwise paid no attention to it. Next day the discharge had ceased; he had a slight headache but otherwise felt well. On May 8th the headache was worse but he was able to go to Birmingham on business in the morning; at 11 o'clock he became very dizzy, vomited, and started to feel very ill. He was able to return to his home 15 miles away; on the following day he was seen by Dr. C. A. Day. The temperature was 101° F., the pulse-rate 70; he complained of violent headache and pain in the neck and over the sternum, and he vomited several times during the day. On May 10th the pain in the head and neck was a great deal worse; temperature 102°, pulse-rate only 68; he was seen by an aural surgeon (Mr. W. Hallchurch) who could find nothing in the ears to account for the trouble.

On the following day he was removed to a nursing-home where he was seen by myself in consultation with Dr. Day. Temperature at this time 101°, pulse 62. The pain in the head and neck was very violent; the patient showed Kernig's and Brudzinski signs, otherwise physical examination was negative. Lumbar puncture was performed, and turbid fluid obtained under pressure. Examination of the fluid showed numerous pus cells but no organisms could be seen. In view of the apparent aural source of the infection the streptococcus was regarded as the most likely cause of the infection and it was decided to inject antistreptococcal serum. A second lumbar puncture was performed and 30 c.cm. of turbid fluid withdrawn. A mixture of 10 c.cm. each of polyvalent antistreptococcal and of antiscarlatinal serum (B. W. & Co.) introduced intrathecally.

The fluid withdrawn at first puncture was sown into glucose ascitic broth and on to an ascitic agar plate, half of which had been covered with a thin layer of human blood agar as a means of identifying hæmolysis should streptococci be present. The broth gave no growth, but after 48 hours' incubation the plate showed numerous minute colonies growing only on the blood-covered half of the plate. Microscopically the organisms consisted of a very minute Gram-negative rod morphologically identical with the bacillus of Pfeiffer. Attempts to subculture it were unsuccessful and it was never again obtained from any subsequent puncture. The fact that it grew only in the presence of blood classed it as hæmophilic, and this, together with its appearance, served to identify it as a member of the Pfeiffer group.

The patient continued to run a temperature up to 102° for two weeks; for the first week the condition remained practically unchanged; lumbar puncture was performed daily on six consecutive days; on every occasion turbid fluid under pressure was withdrawn. From the end of the first week on there were signs of improvement, and lumbar puncture was performed on alternate days for three days, making a total of twelve punctures in 16 days.

In the first specimen of cerebro-spinal fluid the cells, all polymorphs, were too numerous for counting. By May 15th they had fallen to 2000 per c.mm., thereafter they fell until on the 17th they had reached about 400 per c.mm. They remained more or less at this level up to the time of the last puncture. Sugar was absent from the first specimen of fluid obtained and remained absent until that obtained on the 17th; thereafter no observations were made; the chlorides on first examination were 0·66 per cent.; by May 13th they had fallen to 0·59 per cent.; by the 16th they had risen to 0·61 per cent.; thereafter they rose slowly and at the time of the last puncture on the 25th were 0·63 per cent.

From the end of the second week the temperature fell gradually; it took two weeks for the range to fall within normal limits; by this time the patient was obviously on the way to recovery. He was well enough to leave the nursing-home 28 days from the time of his admission.

In September the patient went for a pleasure cruise, during which he apparently took advantage to the full of all the available means of diversion; he returned to his business on the Stock Exchange at the beginning of October. His health is now excellent but temper very bad; he complains only of a continuous annoying pain over the coccyx.

DR. HARWOOD LITTLE'S CASE

The patient, a boy aged 8 years, was seen by his doctor on Feb. 16th, 1933, with slight pyrexia, coryza, and sneezing, the condition being apparently influenzal. On the 18th his morning temperature was 102° F.; he complained of no pain and the evening temperature was normal. During the night he had acute pain in left ear. Feb. 19th: morning temperature 105°. Surgeon called in, who lanced the tympanum and released a little pus. Feb. 20th: ear quite clean, but morning temperature 105°.

I saw the child for the first time that evening. There was neither headache nor vomiting, but flexion of the neck caused pain in the upper dorsal region; there was a doubtful Babinski in the right side, and a distant suspicion of a positive Kernig's sign. Lumbar puncture produced 22 c.cm. of clear fluid under pressure and examination of the fluid gave the following results. Cells: 10 per c.mm., of which 60 per cent. were polymorphonuclears and 40 per cent. endothelial cells. No small lymphocytes were seen, and no micro-organisms were found in the stained deposit. Globulin: slight but distinct increase. Protein: 45 mg. per 100 c.cm. Sugar: 25 mg. per 100 c.cm. Chlorides: 720 mg. per 100 c.cm. The fluid was plated at the bedside on to warm Fildes's medium and on to warm blood agar. Both plates gave a sparse growth of a Gram-negative bacillus morphologically of Pfeiffer type. It survived one subculture, and then died in spite of strenuous efforts to keep it alive. At the time of lumbar puncture a leucocyte count showed: white cells 59,600 per c.mm.; polymorph neutrophils 85 per cent.; eosinophils 0 per cent.; basophils 0 per cent.; lymphocytes 10 per cent.; and monocytes 5 per cent. There were many immature neutrophils and some metamyelocytes.

Feb. 21st: morning temperature 105° and evening 103°. Feb. 22nd: white cells, 15,500 per c.mm., with 76 per cent. neutrophils and no eosinophils. From Feb. 23rd onwards the temperature was normal. The patient left the nursing-home ten days later, and has been in perfect health since.

These two cases were communicated to the discussion on the prognosis in meningitis held at the meeting of the Association of Clinical Pathologists on Jan. 27th last.

EPIDERMOLYSIS BULLOSA WITH PSORIASIS

By A. G. Smith, M.D. Glasg., F.R.C.S. Eng.
CONSULTING DERMATOLOGIST, NORFOLK COUNTY COUNCIL

Epidermolysis bullosa is a decidedly rare disease, and the combination of epidermolysis bullosa and psoriasis is still more rare.

The patient, whom I first saw seven months ago, was a little boy of seven, the *only* son of first cousins. A maternal aunt suffered from psoriasis, but otherwise there was nothing of note in the family history. The child was mentally alert.

The mother, an intelligent young woman who had been a school teacher before marriage, stated that she first noticed something wrong with the child's skin a few months after birth. The most trivial injury produced a blister which burst, left a raw area, and in a fortnight or so healed with the formation of a scar. The skin seemed to be excessively vulnerable and responded with a blister to the slightest stimulus. A year ago she first noticed a psoriasis patch on the healed scar of an epidermolysis bullosa lesion on the left knee, and since then many patches of psoriasis had arisen. When I saw the child he presented a typical picture of severe epidermolysis bullosa—the pemphigus successif à kystes épidermiques of Darier. The dorsa of the hands and fingers, the elbows, knees, and feet were the areas most severely affected, but there were healed lesions on the trunk and on the ears. His markedly sunburnt skin was speckled in these sites with thin white scars, amidst which were numerous epidermal cysts. Here and there raw lesions showed red, and numerous recent bullæ, some containing blood, were present. The nails of the fingers and toes were reduced to shapeless knobs of horny material; the teeth were decidedly carious. The psoriasis patches were quite typical and were disposed on the knees, elbows, and back in guttate formation.

I was hesitant about using any of the stronger medicaments for the psoriasis in view of the susceptibility of the skin to any injury, but ¼ per cent. cignolin in ung. lanæ co. over a localised area to start with and subsequently on all the psoriasis lesions removed that disease. At the same time I tried the effect of calcium and parathyroid on the epidermolysis bullosa, with little apparent benefit up till the present time.

There are two points of interest in this case apart from the superimposition of psoriasis. The first is that there is no evidence of hereditary affection with regard to the epidermolysis bullosa; this is unusual. I have been at some trouble in investigating the family history of the child reported here, but the little patient appears to be an isolated sufferer in his family. The second feature of interest is in the consanguinity of the parents. G. B. Dowling has met with a similar phenomenon, which he mentioned in a discussion at the Royal Society of Medicine in December, 1932; and later (October, 1933), at the same place, Twiston Davies showed a case of epidermolysis bullosa in which the parents were first cousins.

Norwich.

SEROLOGICAL DIAGNOSIS OF LATENT MALARIA

By E. D. W. Greig, C.I.E., M.D., D.Sc., F.R.C.P. Edin.
LIEUT.-COLONEL, I.M.S. (RET.); LECTURER IN TROPICAL MEDICINE, EDINBURGH UNIVERSITY
C. E. van Rooyen, M.B., Ch.B. Edin.
HALLEY STEWART RESEARCH FELLOW, DEPARTMENT OF BACTERIOLOGY; AND
E. B. Hendry, B.Sc.
CHEMIST, DEPARTMENT OF THERAPEUTICS

A. F. X. Henry has demonstrated [1] the property of malarial sera to flocculate solutions of iron methyl-arsenate and melanin pigment contained in ox choroid membrane. The former test he termed "ferro-flocculation"; the latter, which was found to be more sensitive, "melanoflocculation." Henry maintained that the phenomenon was due to the interaction of melanin pigment, which behaved as an antigen, and a corresponding antimelanagglutinin developed in the sera of malarial subjects. He regarded the reaction as specific for malaria and of value in the recognition of the latent infection when parasites were absent in peripheral blood. Several continental workers have confirmed [2] the latter observation and we have obtained similar results.

A number of difficulties have however been encountered owing to the unsuitability of crude aqueous suspensions of ox choroid membrane for use as antigen, arising from its instability and the large amount of ox tissue derivatives contained in it other than melanin pigment. The test as employed by

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[1] C.R. Soc. Biol., 1928, xcix., 819; Arch. f. Schiffs- u. Tropen-Hyg., 1934, xxxviii., 93.

[2] See Greig, E. D. W.: Trop. Dis. Bull., 1934, xxx., 483.

Henry merely signifies that the serum examined has or has not agglutinated the antigen in a single low dilution. No provision was made for assessing the degree of positivity exhibited by different sera or the same specimen at various stages during the course of an illness. We have attempted to overcome these difficulties by the substitution of human hair for ox choroid membrane as a source of pigment, and by alterations in technique.

TECHNIQUE OF THE NEW TEST

The melanin pigment solution is derived from human hair by hydrolysis with 50 per cent. HCl, followed by concentration in vacuuo and purification by dialysis in a collodion membrane. This has been found to give a pure and stable suspension of pigment. A set of nine dilutions of patient's serum is prepared ranging from 1 : 2 to 1 : 512 in distilled water. To each is added an equal volume (0·4 c.cm.) of pigment solution, and the series is incubated at 37° C. for 5½ hours before the reading is taken. Positive results are observed as white granular precipitates forming at the foot of the tube; the degree of positivity is determined by noting the highest dilution of patient's serum showing precipitation.

The rise and fall of the reacting principle in human malarial sera with melanin pigment may thus be quantitatively ascertained during an attack. The method was tested on benign tertian infection induced in cases of G.P.I. Preliminary observations showed that the reaction appears about the 5th–7th day following infection, although no parasites may be seen at this stage and the patient is afebrile. The maximum titre of 1 : 128 is reached about the 4th week and then rapidly declines following the administration of drugs. Control tests on 129 different non-malarial sera gave only 2 non-specific positive results.

It is probable that the phenomenon is not due to the interaction of antigen and antibody, for it can be shown that positively reacting sera may be inactivated by heating to 55° C. for half an hour and that the repeated immunisation of rabbits with melanin pigment fails to produce an agglutinin response. The occurrence of a reaction with positive sera and dioxyphenylalanine shows that the reaction is due to the melanin and not to any other substance.

Observations on the lipoid phosphorus content of the serum during the course of the infection show that its amount tends to vary inversely with the reacting titre of the serum to melanin pigment. We suggest that the term melanoflocculation test should be dropped and melano-precipitation reaction substituted.

These findings were submitted to a meeting of the Edinburgh branch of the Royal Society of Tropical Medicine and Hygiene on May 15th, 1934, and a full account of them will appear in the July issue of the *Transactions* of the Royal Society of Tropical Medicine and Hygiene.

MEDICAL SOCIETIES

ST. JOHN'S HOSPITAL DERMATOLOGICAL SOCIETY

PROSSER WHITE ANNUAL ORATION *

Dr. J. M. H. MACLEOD, the president of the society, took the chair on June 27th when the annual oration was delivered by Dr. WILLIAM ALLEN PUSEY, emeritus professor of dermatology in the University of Illinois.

The PRESIDENT said that in 1921 Robert Prosser White established a Trust Fund to provide an honorarium for an annual oration on the progress of dermatology, the orator to be selected by the council of the St. John's Hospital Dermatological Society. It had been laid down in the original deed that the name of the founder should not be revealed until after his death. Prosser White had died in January of this year, and the lectureship was now known as the Prosser White Oration.

Dr. PUSEY took as his title

Disease, Gadfly of the Mind

He devoted special attention to the stimulus of skin diseases in the development of the mind. Socrates, he recalled, had in the deepest seriousness emphasised his function of intellectual gadfly as his great service to the Athenians, a function placed upon him by God and so important that he claimed the favours reserved for Athens' worthiest citizens. The human mind had to develop itself, and its making was not a psychological or a physiological study but an historical one. The need to surmount the difficulties of life had always been the spur that had urged man on to intellectual as well as to physical effort. In that sense man's troubles had made him. Few incentives to thought had earlier influenced or more constantly prodded man in his progress than the injuries, pains, and illnesses that had beset him. Hippocrates had recognised this. The early efforts of man to find relief from his miseries had done a great deal more than gradually accumulate empirical knowledge; they had begun his training in technical skill. From the earliest records medicine had been one of the chief concerns of the mind. The greatest heights of early independent thought had been reactions to the study of disease. From every point of view disease had been one of the greatest gadflies to scientific thought. Disease and its student medicine could properly claim to be among the great forces in the evolution of the human mind.

Skin diseases and dermatology could take a very large part of the credit of medicine, for they had constituted one of its major interests from the very beginning. Indeed, when civilisation emerged from the stage of history man had already been considering not only the diseases of the skin but also its care and beautification. The best illustration of the persistence of vitality of medicine in the Middle Ages was furnished by dermatology. At that time eight diseases had been regarded as contagious and five were predominantly skin diseases: bubonic plague, consumption, epilepsy, scabies, erysipelas, anthrax, trachoma, and leprosy. Leprosy had been largely responsible for the growth of hospitals and had given a new impetus to the objective study of disease. Since the diagnosis of leprosy changed the civil status of its victims, it was a matter of great civil importance. There was much evidence that the study of leprosy brought dermatology and general medicine to a higher plane of knowledge in this period. De Mondeville's description of the facies of leprosy was notable for accuracy of observation, vividness of description, selection of essential features, and evidence of a mind thinking in objective terms. By the end of the fifteenth century leprosy had been rapidly dying out, but it had been succeeded by the new plague of syphilis, which had done more than anything else to stimulate the objective study of diseases.

LANDMARKS OF DERMATOLOGICAL PROGRESS

A significant example in the last three hundred years was the work of Ramazzini on occupational dermatoses. To the list of things which the physician should inquire as laid down by Hippocrates, he added one more: "What trade is he of?" Another striking illustration was the description of chimney sweeps' cancer of the scrotum by Percival Pott in 1775. This was the pioneer landmark in the history of our knowledge of the causes of cancer, drawing attention both to tar and to long-continued irritation. In the skin, as nowhere else, was given the opportunity for the recognition and study of cancer in its early stages. Another landmark was the beautiful demonstration by Bonomo of the causal rôle of the itch mite in scabies. Ramazzini and Bonomo had been among the first to demonstrate clearly the direct action of local causes in the production of inflammatory diseases, and their work was an epochal step in the advance of knowledge of pathology.

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* This oration will be published in full in the Proceedings of the Society.

The skin was a happy hunting-ground for the investigation of the facts, particularly the minute facts, of biology and medicine. Unna had pointed out in 1896 that this exceptionally favoured position of the dermatologist brought with it a serious responsibility: to analyse the histological details closely and not to rest until macroscopical and microscopical appearances had been brought into agreement. Cutaneous pathology, he had observed, must have a great bearing on general pathology. A good modern illustration of this was Sir Thomas Lewis's use of the cutaneous circulation to illustrate methods of physiological investigation and interpretation of the phenomena of the peripheral circulation and small blood-vessels in general. Another example was Cockayne's study of abnormalities of the skin and its appendages in the light of genetics. The successful study of the finer details of tissues dated from the perfection of section cutting and differential staining by Carl Weigert, who at first applied his technique to the study of the small-pox eruption. Unna had carried staining methods still further and incidentally had discovered plasma cells and described other new forms of connective tissue cell.

The general ideas of contagion and its causes were likewise in great part the result of the study of dermatology. Fracastor, with his strong interest in syphilis and skin diseases, had developed the idea that contagious diseases were due to micro-organisms. Hauptmann of Dresden and Langer of Leipzig had suggested independently in the seventeenth century that all skin diseases were of parasitic origin. The first fact in human microparasitology was Schönlein's discovery of the organism of favus. The demonstration by Hansen of the bacillus of leprosy in 1871, eleven years before the discovery of the tubercle bacillus by Koch, was one of the earliest observations of pathogenic bacteria.

Studies of the skin manifestations of exanthemata had profoundly influenced modern conceptions of infection and immunity. Fuller in 1730 had clearly indicated the specificity of infection. The skin had likewise been the site of the first studies of what was now called allergy and sensitisation. Jenner had pointed out the allergic relationship between small-pox and vaccinia, and a group of Englishmen and Scotsmen had made a remarkable series of studies on the skin towards the end of the eighteenth century. The acquired tolerance of the skin to the bites of parasites and various insects had early led to the production of artificial immunity and later to the study of immunity generally. The critical tests of immunity to-day had developed from investigations on the skin, and their practical application was made in the skin. The skin was said to possess a degree of immunity more than ten times as great as that of muscle, brain, or blood. It was quite possible that the studies of the cutaneous manifestations of allergies might open up new chapters in the knowledge of the pathogenesis of important diseases of internal structures.

From time immemorial the influence of the general health on the skin had been emphasised; perhaps over-emphasised, but the influence of the skin on the general health was a relatively new conception. It performed chemical functions of vital importance, particularly under the influence of light.

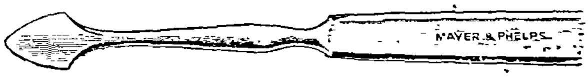
Knowledge of the relation between the skin and the ductless glands went back at least a century, to the time when Addison described the disease which bore his name. The skin itself was now being recognised as an organ of metabolic activity and Kreidl had even suggested that it had an internal secretion. Hertslet had suggested that it might be a hormone balancer. The endocrine and metabolic functions of the skin had been used empirically by Finsen.

Dr. Pusey's thesis, he said in conclusion, was that diseases had been among the greatest incentives in the making of the mind and that few diseases had as great an influence as those of the skin. He did not believe that this excursion was a fanciful or trivial speculation. There was nothing more important in the evolution of civilisation than those relatively few goads of the mind which had first lifted the human race out of barbarism. The great rôle that skin diseases had played in the making of the human mind was the great challenge to dermatology to be worthy of its heritage and of its great opportunity.

NEW INVENTIONS

A KNIFE FOR SUBMUCOUS RESECTION OF THE SEPTUM

THE knife, here illustrated, has been designed and used by me for the submucous resection of the septum. It is double edged at the sides and somewhat oval-shaped at its extremity. The incision in the mucosa begins in the uppermost angle of the nostril and is continued in one sweep right down to the floor of the nose. The lower cutting edge starts the incision, about half-way down the septum the extremity of the knife takes it up; then the upper cutting edge is engaged, and finally the extremity is again used to complete the incision on the floor of the nose. The advantages claimed are: facility of producing the incision with one single sweep and the impossibility of penetrating the septum, while it takes the place of a sharp dissector to detach the muco-perichondrium.



Mayer and Phelps, of 59-61, New Cavendish-street, W., are the makers of the instrument.

ARTHUR MILLER, F.R.C.S. Edin., D.L.O.

A NEW MENTAL HOSPITAL.—Mr. L. G. Brock, chairman of the Board of Control, laid the foundation-stone, last week, of a new mental hospital at Runwell, near Wickford, Essex, the former property of the corporations of East Ham and Southend. It is placed upon a site of 500 acres, and will eventually accommodate 1085 patients; at present it is being designed for 875. There will be a large nurses' home, and on a portion of the site there will be provisions for "parole" patients. The total cost will be £462,000.

REVIEWS AND NOTICES OF BOOKS

Forty Years of Psychiatry

By WILLIAM A. WHITE, M.D., Sc.D. New York: Nervous and Mental Disease Publishing Co. Pp. 154. $3.00.

Recent Advances in Psychiatry

Second edition. By HENRY DEVINE, M.D., F.R.C.P. London: J. and A. Churchill. Pp. 364. 12*s.* 6*d.*

1933 Year Book of Neurology and Psychiatry

Neurology. Edited by PETER BASSOE, M.D. *Psychiatry.* Edited by FRANKLIN G. EBAUGH, M.D. Chicago: The Year Book Publishers. 1934. Pp. 471. $2.25.

THE remarkable development of psychiatry during the last half century may be appreciated when one finds it summed up in the life and comments of an observer who has acted a prominent part in the promotion of this development. But the range of psychiatry is now so wide that the interests of even an unusually experienced man like Dr. White are of necessity limited. It is instructive to read first his account of what has happened in the United States, especially in regard to mental hospital administration and in the psychological approach to mental disorder; and then to go through a comprehensive survey of the present trends and knowledge, such as Dr. Devine supplies, and finally to glance at a cross-section of the current literary output in the 1933 Year Book of Neurology and Psychiatry.

Dr. White entered psychiatry when it was remote from general medicine, and he found the care given to the insane deplorable. He became superintendent of an important mental hospital (where there are at present 5000 patients), and he not only built it up with extraordinary ability but was among those in America who most energetically gave effect to the prevailing ideals—that mental disorder should be regarded as an illness, treated and investigated, given a large place in medical education, and brought into relation with other human problems, especially social ones. It might be supposed that the qualities requisite for the guidance of such an institution as St. Elizabeth's Hospital would hardly be associated with an ardour and receptivity for new, highly unorthodox ideas, but Dr. White early opened his mind to psycho-analysis and has espoused it with few reservations; he is one of those who see in it the most fruitful influence in modern psychiatry so far, and the most promising of further advance.

Dr. Devine gives a somewhat different picture. It is not that he is antagonistic; he is indeed sometimes so anxious to do justice to this school of thought that he falls into inconsistency, and one of the few points deserving of extension in his admirable book is the tacit assumption that there is practically no psychopathology other than that of the analysts. But since his task is to cover the whole field of psychiatry, he necessarily devotes much space also to those biological, metabolic, clinical, and experimental studies which have done so much to advance our knowledge. The three new chapters introduced into the second edition are concerned with heredity and with some clinical and chemical correlations. His fair presentation constantly reminds one how many are the aspects of this field, even when it remains strictly medical, and how difficult it is to tell which line of study will yield most, and which has fallen victim to bias, irrelevance, licence of hypothesis, or carelessness in verification.

Dr. Ebaugh's summary of current literature of the year is unfortunately heavily weighted on the side of American studies in what one may call the nebulosities of psychiatry—education, mental hygiene, social psychiatry, the psychiatric attitude and so forth; it has also the defect of being somewhat uncritical and of being written in a barbarous, careless English. It is useful in so far as it shows up the uncertainties in psychiatry, where so much is clinically fixed and useful and so little fundamental knowledge established. The contrast with neurology, the year's work in which is well presented by Dr. Bassoe in the same volume, is striking. Some might urge in excuse that neurology is a finite study, while psychiatry is living and in flux. But such a view would not only be unjust to neurology, but would ascribe to growth and vitality in psychiatry what is at least in part only evidence of a myopic and immature zeal on the part of workers with more knowledge of a special mode of investigation than of the actual material and problems of mental disorder to which they would apply it. It must be admitted that psychiatry needs a more complete background of accepted fact before scientific work can be readily communicable and discussion on it profitable.

Die Parasagittalen Meningeome

By Dr. H. OLIVECRONA, Stockholm. Leipzig: Georg Thieme. 1934. Pp. 144. M.24.

THE meningiomas form about 15 per cent. of all intracranial tumours and usually grow from an accessible part of the dura mater. Their diagnosis and accurate localisation are therefore of considerable importance. Dr. Olivecrona has presented in this monograph an elaborate study and analysis of his observations in 34 examples of parasagittal meningioma. He defines these as tumours springing from the wall of the superior longitudinal sinus alone, or from a combined site consisting of sinus wall and the adjoining dura covering the cerebral convexity. He includes also meningiomas of the falx both because these spring also from the sinus wall in many cases and because they present similar problems in operative technique.

The author divides his cases into three clinical groups according to whether the tumour arises from the anterior (10 cases), middle (14 cases), or posterior (3 cases) third of the sinus wall. In 7 cases the tumour was attached to the falx. A syndrome is outlined for each of the three groups, an outstanding feature in all groups being a long history. The symptoms in tumours in the anterior third are, as a rule, initiated by headache. The frequency of psychic disturbance of variable kind and intensity is stressed; such a disturbance was present in all except one example. Contralateral facial weakness, bilateral papillœdema, and hyposmia or anosmia are also common. Patients with tumours of the middle third of the sinus tend to have motor and sensory disturbances. Jacksonian attacks originating in the lower extremity are an outstanding feature. Psychic changes are rarer than in the first group, and general pressure symptoms develop late. Meningiomas of the posterior third of the sinus are seldom seen. Here hemianopia is a salient feature and, if the tumour is left-sided, sensory aphasic symptoms with alexia and agraphia will probably be found. The less constant signs and symptoms and the main points of differential diagnosis are discussed in reference to all the groups. Tumours of the falx are classified according to the third of the sinus from which they originate.

Many interesting points in the morbid anatomy of the tumours emerge from this study. It is remarkable that Olivecrona has encountered a bilateral tumour in as many as 13 of his cases; the tumour seems to have started on one side and to have extended across the midline either by a process of invasion of the sinus wall or by hooking underneath the free lower edge of the falx. The mechanism of sinus invasion is described and illustrated by a number of microphotographs, which make it clear that the wall of the sinus rather than the lumen is invaded. Even when the sinus is almost completely obliterated the tumour is separated from the lumen by the intimal endothelium. This process appears to be only an exaggeration of the normal tendency of the arachnoid cells to become invaginated into the dural sinuses, forming the so-called arachnoid villi.

This monograph is well balanced and complete from all aspects except that of histological pathology. It is promised in the text, however, that this subject will be dealt with in the near future by Prof. Bergstrand.

Principles of Gynæcology

Fourth edition. By WILLIAM BLAIR-BELL, B.S., M.D. Lond., F.R.C.S. Eng., F.C.O.G., Emeritus Professor of Obstetrics and Gynæcology in the University of Liverpool. Revised and largely rewritten with the assistance of M. M. DATNOW, M.D., F.R.C.S. Edin., M.C.O.G., and ARTHUR C. H. BELL, M.B., F.R.C.S. Eng., M.C.O.G. London: Baillière, Tindall and Cox. 1934. Pp. 848. 35*s.*

THIS text-book has been written primarily for the use of students, for whom Prof. Blair-Bell has set a high standard of scientific training and intelligence. He states definitely that the book does not pretend to provide material for the training of gynæcological specialists though it may well serve as a groundwork for students with this aspiration.

The advances made in gynæcological knowledge since the publication of the last edition have been recorded in this edition. Completely new sections on such subjects as physiological phenomena dependent upon internal secretions, and on certain pathological lesions—for example, endometriomata and ovarian neoplasms—have been supplied. There is also a full review of present-day knowledge of the nature and treatment of malignant disease. New chapters are those on the history of gynæcology and on the sociological questions of contraception and therapeutic abortion, and other ethical and medico-legal considerations which may arise in gynæcological practice. The 144 pages devoted to the section of operative procedures cover much ground, and contain such detailed illustrations of the operations described in the text that the reader can follow the steps of an operation by a study of the drawings alone. Indeed, the illustrations throughout the book are unusually apt. Of the two appendices, one deals with post-operative exercises and the second with the ætiological classification of the causes of certain gynæcological symptoms and manifestations; these should be useful not only to the student reading for an examination, but also to the practitioner responsible for a patient suffering from a gynæcological defect. The index is satisfactory and the printing excellent.

This is a text-book that has definitely made a contribution to the teaching of gynæcology.

Dynamics of Therapy in a Controlled Relationship

By JESSIE TAFT. London: Macmillan and Co., Ltd. Pp. 296. 12*s.* 6*d.*

THIS is an obscure work. The detailed accounts of the cases are interesting and instructive in themselves, and, like the author, we are uncertain as to how the results were achieved. The name relation therapy which she gives to her methods is not very illuminating. All treatment by psychotherapy is relational and depends upon transference. Where her method differs from Freud's is in the insistence on the present situation; resolution is achieved not by reductive analysis, but by the resolution of fear which paralyses the ability to see life as a whole. This fear motive is held to be ultimately derived from its prototype which is the traumatic experience of birth, according to the ideas of Otto Rank. Unfortunately, in the author's attempt to clarify by explaining the dynamics of therapy, she becomes completely submerged in a sea of words.

Eclampsia in England and Wales

By NORMAN PORRITT, M.R.C.S., L.R.C.P., Consulting Surgeon, Huddersfield Royal Infirmary. London: Humphrey Milford, Oxford University Press. 1934. Pp. 88. 5*s.*

THIS small book is written in support of a theory that an insidious form of lead poisoning plays a definite part in the ætiology of eclampsia.

Dr. Porritt first called attention over 40 years ago to the possibility of this form of lead poisoning and he quotes many examples of effects which he attributes to it apart from pregnancy. His theory of its significance in the causation of eclampsia is based largely on a statistical study of maternal mortality figures and on the similarity between the lesions of lead poisoning and those of pregnancy toxæmia. After explaining the cumulative effects of small quantities of lead particularly on the pregnant woman, he points out that a high maternal mortality from diseases other than sepsis coincides with a soft water-supply such as is found in North Wales and the North of England. In these areas, which show a high maternal mortality-rate, there is no increase in the deaths from sepsis, whereas the death-rate from other causes is excessive.

The author has long retired from practice and has not the facilities for proving or disproving his theory. On the evidence put before him the reader cannot fail to be impressed with the reasonableness of the argument and of the necessity for an extensive investigation in a soft water area where eclampsia is common. An explanation of the high maternal mortality in the "black areas" has been offered which can only be investigated on the spot.

British Journal of Children's Diseases

IN the issue of April–June (Vol. XXXI.) Dr. R. F. Guymer contributes a paper entitled Tonsillectomy: Before, During and After, based on a study occupying nearly six years of 182 cases living in the Kingston-on-Thames district. The dissection method was used in each case. The following points are considered: the presence or absence of subjective symptoms referable to the throat, the state of nutrition of the patients, and the average number of professional visits paid to each patient during each year before and after the operation. In no case did the tonsils show any signs of recurrence, and it is now two years since the last operation was performed.—Dr. F. Parkes Weber contributes Further Remarks on Cystic Dilatation of the Common Bile-duct as a supplement to his paper in the previous issue.—In an article on Cases of Median Nerve Palsy Produced by Attempted Intravenous Injections of Calcium Chloride, Dr. Harley Stevens records two cases in which the median nerves had been injured as the result of intravenous injections of calcium chloride when the median basilic vein was utilised. After discussing the manner in which the injury was produced and the regional anatomy he makes suggestions which should enable similar results to be avoided in future.—In his paper on Some Pædiatric Eponyms. v. Young's Rule, Dr. W. R. Bett gives a concise account, illustrated by a portrait, of the life and work of Dr. Thomas Young, who, in his Introduction to Medical Literature published in 1813, laid down the rule regarding the dosage of medicines in childhood.—The abstracts from current literature are devoted to urogenital diseases.

NATIONAL PHYSICAL LABORATORY

THE annual inspection of the laboratory took place on June 21st. As usual the arrangements made to explain the exhibits to visitors were admirable, highly technical apparatus being demonstrated with such skill that its object, if not its mechanism, became clear to those without specialised training. We select from nearly a thousand exhibits a few which show the wide range of work in progress in the various departments of the laboratory under the general direction of Sir Joseph Petavel.

X Ray and Gamma Ray Dosage.—The method used by the earlier workers, and still in wide use for measuring the quantity or "dose" of X rays given to a patient, was to expose a barium platinocyanide pastille to the rays; this pastille changes colour under their influence. Doses which give the same colour change do not always, however, correspond in their medical effects, and a few years ago a more precise definition of X ray quantity was adopted internationally, in which the electrical conductivity produced in air by the rays was taken as basis. Difficulties presented themselves, however, in the design of apparatus for measuring X rays in the new unit, the "röntgen (r.)." The National Physical Laboratory has now developed a standard apparatus, obtainable in portable form and giving results correct to 0·5 per cent.

The gamma radiation from radium differs from X rays only by its great penetrating power consequent upon its shorter wave-length. The difficulties of measuring these rays in r. units are greater than in the case of X rays, but experiments to this end are in progress.

New Acoustics Laboratory.—This laboratory of the Physics Department is now equipped and was on view. It contains a reverberation room and a pair of transmission rooms together with associated measurement rooms, and provides unique facilities for the study of the absorption and the transmission of sound. The rooms, which are asymmetric both in plan and elevation, will facilitate the study of noise transmission and abatement in relation to the design and construction of walls and floors of modern buildings, and the testing of acoustical absorbents.

The Measurement of Colour.—A preliminary model was shown of an instrument which can determine the colour of a specimen without any colour-matching by the eye of an observer. The eye is replaced by a photo-electric cell, in which an electric current is set up by light falling on the cell.

In the system of colour measurement developed at the laboratory—and now adopted internationally—any colour is expressed by three numbers. These numbers may be regarded, in non-technical terms, as measures of the proportion of redness, greenness, and blueness which contribute to the actual appearance of the colour.

In the new instrument, the photo-electric cell "sees" the colour under test through three coloured screens in succession, and the current which it generates is noted in each case. The relative magnitudes of these currents give the three numbers which measure the colour on the international system.

The new instrument is specially useful for rapid determinations of the comparative values of similar colours.

Prevention of Collisions during Fog at Sea.—An instrument has been devised at the laboratory which will give warning on board ship of the approach of other ships in fog.

Although this is actuated by wireless signals, its operation does not prevent ordinary wireless telegraphy, even on the same wave-length. The indicator consists of a glass disc marked "Fore and Aft," "Port and Starboard." Wireless signals from a neighbouring ship cause a luminous line to flash out on the disc in the direction of that ship. If the neighbouring ship is approaching the observing ship the length of the line increases; if the ships are heading for a collision the direction of the line will remain fixed, and the course of the observing ship may be altered to avoid danger of collision.

The device will show the exact direction of a neighbouring ship in foggy weather at any distance up to ten miles.

Automatic Steering of Ships.—Another novel and useful instrument developed in the radio department indicates automatically deviation of a ship from a set course. If the deviation is to starboard a green light is lit, if to port, a red light, while a white light indicates that the set course is being accurately followed.

This "compass" employs an entirely new principle. A jet of electrons is shot out from the filament of a cathode ray oscillograph, and is deflected to the east by the earth's magnetism. Two glass thimbles are disposed so that when the ship is on her set course the electron jet is divided equally between them. As the ship deviates from her course to port or starboard the electron jet is deflected so that it enters only one of the thimbles, and the red or green light is brought into circuit according to which thimble is receiving the jet, thus showing the helmsman which correction to apply.

Known methods of remote control can be incorporated to effect automatic correction of the course.

Measurement of Length in Terms of Light.—The completed apparatus designed and constructed at the laboratory for measuring the yard and the metre in terms of a wave-length of light was on view.

The lengths of the fundamental standards of the country have now been determined in terms of a wave-length of red light. This constant is itself only about one forty-thousandth of an inch long, but it can be measured so precisely that it enables us to control the yard to less than one-millionth of an inch. The important point as regards the use of a wave-length of light in this way is that its length is invariable and can always be reproduced.

Proposals have been made to define the standards of length of the world in terms of a wave-length of light, and international agreement is being sought to this end.

Effect of Wheels on Roads.—Suitable apparatus for measuring and recording road transport forces has been designed, and it is proposed to fit this apparatus to a series of vehicles. The first vehicle, a heavy six-wheeled lorry, ready for sending on the road, is exhibited.

THE LANCET

LONDON: SATURDAY, JUNE 30, 1934

BODY-BUILD AND FUNCTIONAL EFFICIENCY

CRITERIA of physical efficiency provide a perennial topic for discussion and an opportunity for ventilating opinions which are apt to be surprisingly divergent. Those interested in the subject may recall the correspondence in the *Times* in March of last year in reference to tests proposed for selecting candidates for the crews in the University boat-race; a correspondence to which several medical men with personal and clinical experience contributed. In general it was concluded that, so far, no method of estimating exceptional physical efficiency can be accepted as satisfactory. In our present issue, Group-Captain TREADGOLD returns to this problem and applies the results of a large series of observations to a consideration of the relationship between efficiency and body-build, more particularly in the young male adult. Functional efficiency in this connexion he reviews under three headings: . the capacity to endure severe or prolonged physical stress; the capacity to endure severe or prolonged mental stress; and the degree of resistance to disease. Body-build is an expression of the relationship between age, height, and weight, and is simply recorded as weight, with the expressions under-weight and over-weight according to the variations below and above the standards authoritatively accepted as normal.

The accepted entrants to the Royal Air Force fall into two distinct groups, according to whether they are likely to be trained for flying or not. The future pilots form a specially selected group and undergo a much more searching medical examination than the ordinary "airmen" recruits. From TREADGOLD'S graphs the remarkable fact appears that whereas in the latter (non-flying) group the number of under-weight men is double the number of over-weight, among the pilot recruits the figures are almost exactly reversed. This difference may be explained on the principle that the higher standard of fitness demanded in a prospective pilot results in the rejection of many who would be accepted under the less exacting requirements of general service. In addition, the candidates for flying are for the most part from a higher social class and have enjoyed dietetic and hygienic advantages during childhood and adolescence which make for a better physique. To investigate the relation, if any, between body-build and capacity to endure severe or prolonged physical strain, observations were directed to the airmen who competed in the Royal Air Force athletic championships and in such analysis a further differentiation was made into four groups: those competing in the tug-of-war contests, those in field events, those in the shorter distances on the running track from 100 yards to a quarter mile, and those in the longer distance events. Contemplation of the physique essential for such a contest as a tug-of-war prepares one to expect an overwhelming preponderance of the over-weight class. This feature is also prominent in the field events competitors, doubtless from the large contribution afforded by the "strong men" who put the weight and throw the discus and javelin. A like preponderance is evident among the sprinters, a type of athlete in whom a powerful musculature and well-developed frame are essential for the explosive maximal effort that must be put forth for a brief period. But among the long-distance runners extra body-weight must be a serious handicap, for here conservation of energy is all-important in contrast to the prodigal expenditure of the sprinter to whom expense (so to speak) is no object. Although, as has been pointed out by Dr. ADOLPHE ABRAHAMS in his investigations among the leading athletes of the world, there are a few striking exceptions to this rule, the body-build of the marathon runner is often conspicuously poor when one considers the work which is demanded. In relation to extreme physical exertion of another kind it is interesting to note that all the approved personnel of the recent Mount Everest Climbing Expedition were under-weight—a rather unexpected revelation considering the peculiar nature of the exertion with its associations apart from purely physical strain. It would probably be found that these highly specialised climbers, notwithstanding their body-build, had a large vital capacity as well as some special indefinable attribute.

The relationship of body-build to disease has an even closer application to medical work. Group-Captain TREADGOLD classifies diseases under infective (principally pulmonary tuberculosis, chronic otitis media, and rheumatic carditis), non-infective (including epilepsy and digestive disturbances), and psychic disorders (psychoses and psychoneuroses). In all three classes the under-weight subject preponderates, more especially in the first. (These figures, it must be added, refer to the general service men and not to the pilots, who exhibit differences of susceptibility from the special character of their work. It will at once occur to the critical reader that there is some disparity between these conclusions and the universal practice of life insurance offices which view the under-weight applicant as a whole with greater favour than the over-weight, whom they consider likely to live less long. The suggested answer to this is that the poorer functional efficiency of the under-weight person encourages him to lead a relatively sheltered life, and that the accompanying tendency to arterial hypotension provides a consequent immunity to some of the cardiovascular catastrophes of later life. From the point of view of sickness insurance, however, the under-weight must compare unfavourably with the over-weight in his greater liability to disease—a fact to which companies which specialise in sickness policies have not, so far as we are aware, paid any particular attention.

the rest of us valuable assistance in making up our minds, by testing the reasons, so far as they are yet established, for taking one view or the other. The discussions are succinct. Sentiment and tradition will ever influence intelligence, and Heaven forbid that such influence should disappear as worthless, but it is good that its force should be corrected by argument, so that action may follow on what, at any rate for the time being, appears reasonable. We believe readers will see that in the debate published this week the opposing speakers are not so far apart in their teachings as would be suggested by the conversations of the public.

The contrasting of written views is just now a commonplace technique in detective fiction, and no apology is needed for allusion to the methods of this popular form of literary activity although serious matters are under consideration. It is understood that the greatest minds to-day seek relaxation in the pages of these stories, thus following Bismarck whose favourite author was Gaboriau—or so we are always informed. But more dignified and venerable authority can be cited for the method of dialectic comparison. It is the method of Socrates, who, while he left to his great disciple the writing and expansion of the ideas, conducted his own courses of verbal instruction by the balancing of pros and cons. *Taking either side, and regarding the putting of* questions and the supplying of answers as the one way to advance knowledge, he was able to cancel or modify opposing theories; and, while protesting against the pursuit of knowledge for its own sake, he strove to arrive at generalisations through the establishment of particular propositions. That is the spirit in which the problems which lie before medicine should be approached, and it is the spirit which is growing up among modern seekers of the truth; and they, as we were reminded by a recent Harveian orator, are following, consciously or not, Greek example.

Presentations of controversial issues, similar to that published this week, will appear in our pages from time to time as occasion suggests, and the information so afforded will show on what sound grounds medical men may differ, while holding similar ideals for the advancement of the truth.

ANNOTATIONS

HEREDITY AND DISEASE

THE Buckston Browne prize essay for 1932 has been published[1] in book form with a few minor alterations. It consists of four sections, dealing generally with the history of medical genetics, modern methods of study in human genetics, original data collected by the author to illustrate some of the principles enunciated in the preceding section, and, finally, the future of human genetics and the relation of medicine to eugenics. It is hardly an introduction to the study of human genetics which will make an appeal to the general practitioner of medicine, who would be mystified by a great deal of special terminology which the author is not at pains to explain. But the serious student of genetics will find it stimulating, for Dr. Penrose brings to his own subject an extensive knowledge also of algebra and of clinical medicine, besides a ready pen and much special erudition.

So far as human hereditary diseases are concerned, it covers a small field. The future of human genetics, we are led to suppose in the last chapter, is rosy. "One of the chief aims of human genetics is to identify as many as possible of the Mendelian characters of man and to allocate the positions of those characters on the chromosomes." This aim, the author thinks, will ultimately come near to realisation through the extensive use of laboratory methods, serological and chemical, such as those which have been employed to demonstrate the heredity of the blood groups. But what will be the benefit to medicine of the mapping of the human chromosomes? Not great, says Dr. Penrose, who belongs to the school which lauds the method of human genetics but disparages its possible results. Genetic methods, according to him, may be useful in reducing somewhat the incidence of dominant autosomal and sex-linked characters, which cause such grave diseases as epiloia, split hand, and Huntington's chorea—all rare, be it noted. "But generally speaking," he says, "it is unwise to be *unduly optimistic about the results of eugenic measures* in medicine." The general effect of the book is therefore somewhat disappointing. The principle of random mating is introduced with a flourish as "one of the most valuable concepts in human genetics." Yet the proposition, is admitted that "human beings do not mate entirely at random." Gentlemen, we have been reminded, prefer blondes. Jews like to marry Jews and Catholics Catholics. As a rule people marry into the same social class as themselves, this being arranged by the parents in France. Geographical propinquity also plays a part. And the situation among primitive tribes, with their systems of marriage taboos and exogamy, is even less favourable to the theory of random mating. In fact, in practice, though not in theory, human mating is anything but random. The introduction of the principle of random mating is followed in most books on human genetics with the emission of a cloud of mathematical confetti, by which the reader is so impressed (or stupefied) that he fails to see that, under a façade of flawless algebra, dubious premises are surreptitiously concealed. Dr. Penrose kindly spares us most of the algebra, which, in a book with a clinical orientation, is a good thing, seeing that the principle of random mating (or at least the algebra) is chiefly concerned with recessive and sex-linked rather than dominant abnormalities for the prevention of which, according to Dr. Penrose, little is to be expected from genetic methods.

Despite the relative uselessness of these methods in preventing disease the help of the medical profession is earnestly solicited in the preparation of authentic pedigrees, in order, presumably, that the human chromosomes may be mapped. If Dr. Penrose's low estimate of the clinical value of the results is correct, the medical profession might be justified in contending that its energies could be better employed; but in our opinion he is unduly pessimistic about the possible results of genetic methods in preventive medicine. *In fact some of his own researches, unquoted in this* book, suggest how they could profitably be used. To give only one example: they are applicable to the subcultural group of mental defectives, which, according to Dr. Penrose, comprise about a quarter of the total inmates of the Royal Eastern Institution.

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[1] The Influence of Heredity on Disease. By Lionel Penrose, M.A., M.D. London: H. K. Lewis and Co., Ltd. 1934. Pp. 80. *5s.*

ANTIMONY IN ENAMELLED WARE

THE Ministry of Health has published a report[1] by Dr. G. W. Monier-Williams on the risks of antimony poisoning when enamelled vessels are used for the preparation or storage of food. Outbreaks of antimony poisoning have arisen from the preparation of lemonade in such vessels, whether real lemons were used or so-called lemonade crystals in which tartaric acid replaces the natural citric acid of the fruit. There is no reason except cheapness why antimony should be found in enamelled ironware, since oxide of tin is a better material for giving the enamel the desired opacity. Tin is, however, the most expensive of the base metals and the use of antimony in its place may lessen the cost by 3 or 4 per cent. (say ½*d*. in the shilling) which would hardly be a sufficient inducement to the purchaser if aware of the serious effects of antimony poisoning. It is clear, from the evidence adduced by Dr. Monier-Williams, that the trioxide, Sb_2O_3 is more dangerous than either the tetroxide Sb_2O_4, or the pentoxide Sb_2O_5. The trioxide or sodium metantimoniate, $NaSbO_3$, is the only compound actually used, but as the enamel is subjected to a high temperature in the process of fluxing it on the iron of the vessel, all three oxides may actually be found in the finished article and in fact were so found. The question of immediate interest is not how much antimony a glaze contains, but how much it is likely to yield to food or drink prepared or stored in vessels coated with it. Two classes of tests were therefore done on hollow-ware articles found to be made with antimonial glaze: (1) analysis of the glaze itself; (2) estimation of the amount of antimony going into solution after allowing hot 2 per cent. tartaric acid to stand in the vessel for one hour with occasional stirring. It is noteworthy that the amount of antimony dissolved from the glaze, whether expressed as volume concentration in the acid solution or as weight per unit of surface exposed to its action, bore no constant ratio to the total amount found in the glaze detached from the vessel. This is no doubt partly due to the fact that a variable amount of the undercoat, which does not contain antimony, is usually chipped off with the actual glaze. Of 11 enamels examined 2 contained less than 1 per cent. of antimony in all states of oxidation, 3 between 1 and 2 per cent., 2 between 2 and 3 per cent., 1 between 3 and 4 per cent., 1 between 4 and 5 per cent., and 2 about 6 per cent. One small jug containing less than 1 per cent. yielded no antimony to tartaric acid; a large jug containing 2·1 per cent. yielded 138 mg. per litre, or 15·65 mg. per square decimetre (this was one of a batch which had caused poisoning at a London hospital); whilst a pie-dish containing over 3 per cent. gave 79·2 mg. per litre or 9·45 mg. per square decimetre, the antimony extracted being mostly in the form of the poisonous trioxide. The effect of repeated treatments with acid was not studied and it is conceivable that as the surface became rough the area of exposure would be increased and more antimony extracted. Having regard to the cases of poisoning (though happily none proved fatal) the prohibition of antimony in all classes of hollow-ware which might be used for food does not seem unreasonable. Some firms have used antimony compounds which they believed to be insoluble, and in some cases the antimony seems to have entered the glaze as an unsuspected impurity. But this circumstance affords little satisfaction to people who have been brought almost to death's door.

MORTALITY FROM PERNICIOUS ANÆMIA

FROM time to time various workers have brought forward figures suggesting that the incidence of pernicious anæmia differs between races. In particular it has been stated that the disease is unduly prevalent in the temperate zones of North America, Northern Europe, and the British Isles. In the minds of other observers there has been considerable doubt whether race really does play any important part in the distribution of its incidence and mortality. A recent study by Dr. Richard Friedlander[1] of 500 cases admitted to the Peter Bent Brigham Hospital (Boston, Massachusetts) between 1913 and 1932 appears to favour the existence of national differences. Of all the patients admitted to the hospital during the period of the survey (over 80,000) 0·62 per cent. had pernicious anæmia; subdivision by nationality shows that over 1 per cent. of the patients from Canada, Sweden, and Denmark had the disease and over 0·7 per cent. of those from Ireland and England as compared with only 0·18 per cent. of those from Russia, 0·17 per cent. from Italy, and 0·06 per cent. amongst negro patients. The weakness of this type of evidence lies in the absence of all knowledge of the type of population from which the cases are drawn. Mortality from pernicious anæmia shows, as may be seen in the statistics of England and Wales, a steady and considerable rise with age and an appreciably higher incidence in the female sex. In other words a population consisting of persons in the older age-groups, or with a preponderance of females, will certainly show a higher incidence than a young population. If, for instance, the Russian patients in the hospital are drawn from a young immigrant male population, their incidence of pernicious anæmia is certain to be low. For a convincing solution of the problem case-rates at ages are essential; proportional rates such as those quoted above cannot be more than suggestive. That they may be fallacious is indicated by a comparison of the figures given by Friedlander for England and Scotland. Of the English patients admitted to the hospital 0·88 per cent. suffered from pernicious anæmia, while of the Scotch patients there were 0·43 per cent., or only half as many. Yet study of the death-rates given in the reports of the Registrars-General for England and Wales and Scotland shows that in fact the Scotch suffer consistently higher rates than the English at every age, and at all ages have a rate over 30 per cent. above that of England and Wales.

Such a complete reversal of the real position in this case makes the validity of the other national differences very doubtful. Friedlander's own opinion is that not only is predisposition to the disease racial in character but that it is largely confined to those individuals with a diathesis characterised by a fair complexion, light hair, blue eyes, and achlorhydria. It should be possible to collect satisfactory evidence on the importance of constitution. An analysis of 51 cases, 36 of which were autopsied prior to and 15 since the advent of liver therapy, showed no change since the introduction of this method of treatment in the weight of the liver, but the earlier group showed a greater weight of the spleen than those treated by liver. Of all cases treated with liver since

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[1] Reports on Public Health and Medical Subjects, No. 73. H.M. Stat. Office. 4*d*.

[1] Amer. Jour. Med. Sci., May, 1934, p. 634.

1926, about 11 per cent. were known to have died. The definite decline in mortality in this country that followed in 1928 the introduction of the Minot-Murphy method of therapy was demonstrated by P. McKinlay.[2] Between 1921 and 1927 the standardised death-rate was, he found, to all intents and purposes constant. In 1928 an appreciable fall was recorded for both sexes, and this improvement in the comparatively short space of time succeeding the introduction of liver therapy naturally raised hopes of a still further decline in the death-rate when the treatment was extended to a still larger number of patients.

These hopes have unfortunately not been fulfilled. Since 1928 the rates (standardised for age) have steadily risen again and in 1932 were only approximately 15 per cent. below those registered in the three or four years preceding the new treatment. Comparison of the death-rates age by age shows that in 1928, when the treatment was widely adopted, the mortality was appreciably lower than in 1927 in each decade of life from 25 years onwards. Yet in 1932 the mortality of females in each age-group was more unfavourable than that recorded in 1928, though at ages 25–65 it is still much lower than the mortality in 1927. At ages over 65 years the females in 1932 have even higher death-rates than in 1927, the year in which liver treatment was introduced. Amongst males, the death-rates at each age over 45 are considerably higher in 1932 than in 1928, though only in old age, over 75 years, does the rate exceed that registered in 1927.

The fall in the death-rate that immediately followed liver treatment was very striking. The subsequent lack of improvement, and in most age-groups an actual deterioration, is a problem which demands attention. If, as Dr. L. J. Witts suggests on another page, the prognosis of pernicious anæmia is chiefly determined by the care and skill of the physician and the coöperation of the patient, it should be possible to reduce the death-rate considerably. Probably the most common mistake is under-dosage. It is heartening to note the opinion of one so experienced in the treatment of pernicious anæmia as Dr. Witts that if certain precautions are taken "a patient with pernicious anæmia probably has the same expectation of life and physical well-being as his fellow men."

INFLUENZAL MENINGITIS

SINCE the first authentic case of influenzal meningitis was described by Slawyk[3] in 1899, a considerable number of other workers have studied the disease. T. M. Rivers[4] in 1922 was able to collect records of 220 cases, while F. E. Koch and E. Krämer[5] in 1931 increased this number to 298. The disease must, however, be considerably more common than these figures would suggest. Recently Neal, Jackson, and Appelbaum[6] have reviewed 2727 cases of meningitis which they have seen in the past 23 years, and of these no fewer than 111 were due to the Pfeiffer bacillus. In its clinical and pathological manifestations influenzal meningitis presents a curious uniformity. By far the greater number of cases occur in infancy and early childhood, 60 to 80 per cent. being in children under two years of age. Most often the disease appears to be primary, though preceding or concomitant conditions, such as pneumonia or otitis media, which are by no means necessarily due to Pfeiffer's bacillus, are often observed. The symptomatology closely resembles that of meningococcal meningitis, and one of the most frequent initial symptoms in infants is gastro-intestinal disturbance. The cerebrospinal fluid is under pressure, is cloudy or purulent, has a high cell content, especially of polymorphs, and shows a variable increase in protein and often a marked decrease in sugar. Gram-negative bacilli, with the typical Pfeiffer morphology, sometimes accompanied by long thread forms, are seen microscopically, and can usually be cultivated on suitable media. The same organism can often be isolated from the blood stream, and from the purulent joint exudates which are sometimes observed as a complication of the disease. The organisms produce indol and resemble Pfeiffer bacilli of respiratory origin very closely. They differ from these, however, in their high pathogenicity for laboratory animals. Injected intraperitoneally into rabbits, guinea-pigs, rats, and mice, they frequently give rise to a fatal septicæmia and to purulent effusions in the serous cavities.

The disease is often prolonged, lasting usually 10–20 days, and having a very high mortality-rate—somewhere about 95 per cent. This fact renders all the more interesting the two cases, recorded in our present issue by Dr. S. C. Dyke and Dr. C. J. H. Little, both of which made a perfect recovery. Whether this was connected in any way with the age of the patients, 22 years and 8 years respectively, it is impossible to say. It is noteworthy that the meningeal infection seems to have been relatively mild, for in neither case were the organisms found microscopically in the cerebro-spinal fluid. The treatment of the disease has so far proved disappointing. In the United States the tendency is to perform frequent lumbar punctures and to inoculate anti-influenzal serum both intrathecally and intravenously.

SCIENTIFIC RESEARCH AND SOCIAL NEEDS

AT the suggestion of the B.B.C. Mr. Julian Huxley went on a tour through Britain to see what science was doing for human life; this led to a dozen wireless talks which have now been published in book form.[1] He considers in order the influence of scientific research in our universities and institutes on food, building, clothing, health, communications, war and international relations. The descriptive chapters contain a wealth of interesting though scrappy information about the recent applications of research to industry of various kinds; interspersed among them are four real or imaginary and rather tedious conversations wondering what it all means. The tone and atmosphere of the whole is perhaps best shown by the author's own conclusion as stated in the preface: "I became more and more impressed with the fact that both our existing structure of civilisation and our hope of progress are based on science." What exactly is meant by "science" is not clear; presumably an attitude of mind which prefers to have tolerably sound reasons for its beliefs and, where possible, to test them by experiment. If empirical experience is ruled out, then the word "fact" which Mr. Huxley glibly substitutes for "notion" is quite out of place; our existing civilisation is largely based on the shrewd appreciation by then ancients (and perhaps by our more remote ancestors) of such fundamentals as that fallowing increased the fertility of the soil, that close contact with excreta was objectionable, that cabbage was first-rate food, that human kindness was above rubies. "Science" may have discovered why some of these things are good, but it certainly did not find out that they were good nor is their incorporation into daily life due to its advocacy. What Mr. Huxley probably means is that, especially in recent times, deliberate scientific investigation has enabled many alterations to be made in the surface details of life. With this everyone will agree and almost everyone will be grateful for better food, better houses, better health, and the generally easier and richer existence which has become available. We deprecate, however, his implication that "science" is all that is necessary for salvation; it makes its substantial contribution to our comfort and convenience, but he claims too much for it; good men are useful too.

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[2] THE LANCET, 1929, ii., 1086.
[3] Zeits. f. Hyg., 1899, xxxii., 443.
[4] Amer. Jour. Dis. Child., 1922, xxiv., 102.
[5] Münch. med. Woch., 1931, lxxviii., 1131.
[6] Neal, Josephine B., Jackson, H. W., and Appelbaum, E.: Jour. Amer. Med. Assoc., 1934, cii., 513.

[1] Scientific Research and Social Needs. By Julian Huxley. London: Watts and Co. 1934. Pp. 287. 41 plates and 8 text figures. 7s. 6d.

RESEARCH IN BACTERIAL CHEMISTRY

THE Medical Research Council announce the inauguration of new arrangements for further combined chemical and bacteriological investigations into the conditions which govern the life and multiplication of micro-organisms causing disease. These have been made possible by the generous coöperation of the Middlesex Hospital medical school, the trustees of the late Lord Leverhulme, and the Sir Halley Stewart Trust. Accommodation and facilities are being provided at the Middlesex Hospital in the Bland-Sutton institute of pathology and the adjoining Courtauld institute of biochemistry. The investigations will be directed by Dr. Paul Fildes, F.R.S., who has been appointed a member of the scientific staff of the Medical Research Council. The other workers are Mr. B. C. J. G. Knight, with a Halley Stewart research fellowship, and Dr. G. P. Gladstone and Dr. G. Maxwell Richardson, holding Leverhulme research fellowships. The arrangements took effect on June 1st, and the support given by the coöperating bodies is sufficient for an initial period of five years.

A BEQUEST TO A NON-EXISTENT HOSPITAL

IT is unfortunate that people who mean to leave money to a hospital should, in making their wills, sometimes use such an inexact description of the hospital as to defeat their generous object. A fresh case of this kind came to light last week on a summons before Mr. Justice Bennett. Thomas Stanley Forshaw, who died in 1930, left property (subject to a life interest) unconditionally to "the Middlesex Children's Hospital, Middlesex-street, London, W." What did he mean? There was in Middlesex no "Middlesex Children's Hospital." There was a Middlesex-street in London, but not in "London, W.," and there was no hospital in Middlesex-street. Consequently, as the judge remarked, there was no institution which bore the name or the address to be found in the will as the institution to which Mr. Forshaw gave the property. The Middlesex Hospital in Mortimer-street was able to show that Mr. Forshaw had taken an interest in its work; the evidence, it was suggested, pointed to the conclusion that Mr. Forshaw had the Middlesex Hospital in Mortimer-street in mind when he made the bequest. The judge, however, did not find the evidence conclusive. There remained a legal question to be decided—did the legacy fail and did the property pass to the next of kin as on an intestacy or would the court apply what is known as the *cy-près* doctrine? This mysterious-looking law-French expression means that the court will try to get so near (*si-près*) to the testator's intentions as it can; it will give an approximate interpretation to the language he has used. But courts are not prepared to apply the *cy-près* doctrine unless satisfied that the testator meant to benefit a particular charitable purpose rather than a particular institution. Mr. Justice Bennett declared himself not so satisfied. He found himself without any clue to Mr. Forshaw's intention apart from the words which named "The Middlesex Children's Hospital, Middlesex-street, London, W." As the address of a particular institution was so specifically set out in the bequest, the judge felt obliged to hold that the testator had an institution in mind and not a purpose. In the circumstances, the judge concluded, it was impossible to find the institution. The legacy therefore failed and the property went to the next of kin as if on an intestacy.

THE USE AND ABUSE OF A SALT-FREE DIET

FOR many years the salt-free régime has been used as a therapeutic measure particularly in disorders of the kidney. A series of communications from a score of continental physicians on the indications for and against this treatment appear in a recent issue of *La Vie Médicale.*[1] It is generally accepted that the use of salt-free diets arose from the work of Widal in France and Strauss in Germany. Widal found that in patients with œdematous nephritis salt administration increased and withdrawal of salt decreased the amount of œdema. In many cases this relationship was found to be so definite that variations in the degree of œdema could be produced at will by altering the intake of common salt, and the treatment of œdema by a salt-free diet achieved widespread and deserved popularity. Unfortunately this success in cases of dropsy led to the indiscriminate use of salt-free diets in other disorders. In chronic œdematous nephritis the value of a salt-free diet in reducing œdema is scarcely disputed. Many ambulant cases of chronic nephritis with swollen legs and puffy faces can be kept free from these discomforts merely by restricting the intake of common salt. Often it is enough if no salt is used in the cooking or at table, but sometimes it is also necessary to recommend salt-free butter and bread. In cases of dropsy so severe that the patient is bedridden a salt-free diet usually removes some but not all of the œdema.

Any amelioration of œdema is appreciated by the patient. In a prolonged, trying, and often hopeless illness it provides what appears to be tangible evidence of at least a partial recovery. In mild cases it allows the patient to undertake more bodily activity and in severe cases often relieves the mechanical discomfort due to stretching of the skin and subcutaneous tissues. Moreover, the complications of sepsis in œdematous limbs and of pulmonary œdema occur less frequently if the accumulation of large dropsical effusions is limited by a salt-free diet. While patients are usually more comfortable on a salt-free diet, however, it is doubtful whether this régime produces any durable improvement in their health, and it is therefore important to know whether any disadvantages are attached to its enforcement. In 1928 L. Blum observed in certain cases of nephritis a marked increase in blood-urea, previously normal or but moderately raised, when salt was withdrawn from the diet. It is scarcely surprising, therefore, that many physicians hesitate to recommend this diet to patients who already have a tendency to nitrogen retention in the blood. It seems, however, that, in chronic nephritis with œdema, nitrogen retention rarely in practice gives rise to the symptoms which are usually associated with a failure to excrete the products of nitrogen metabolism. A salt-free diet often causes loss of appetite and, it is said, digestive disturbances. The loss of appetite is in part due to the lack of taste in the food and may recover almost at once when salted food is given. In a few cases there may be a genuine interference with the digestive function. Nervousness, twitching movements of the skeletal muscles, and headache are also said to develop as a result of a salt-free diet. These symptoms do not, however, arise frequently, and when they do occur in nephritis it may well be that they are the results of early uræmia and not of salt deficiency.

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[1] La Vie Médicale, April 25th, 1934.

A salt-free diet has been recommended in œdema due to causes other than chronic parenchymatous nephritis. Thus in dropsy due to congestive heart failure it appears that a reduction in the intake of salt decreases the rate at which the fluid accumulates and in some cases hastens the removal of œdema and ascites. The use of a salt-free diet in non-œdematous cases of nephritis as a rule is to be condemned, because there is no clear evidence of its value and because the nitrogen retention and the digestive disturbances which may attend its use may cause discomfort if not actual harm to the patient. A possible exception to this rule is in a condition called "chloruræmia," where there is an accumulation of chlorides in the blood. Chloruræmia occurs in non-œdematous cases of nephritis, and in these cases the high plasma chloride upon which the diagnosis depends can be reduced to normal limits by diminishing the intake of salt. Whether anything is to be gained by this procedure is not yet clear. In essential hypertension a salt-poor diet frequently produces a fall in the blood pressure. There seems to be no objection to its use, though the mechanism of this process is unexplained. The treatment of epilepsy by bromides may be reinforced by a salt-free diet, the chloride of the body is replaced by bromide and less of the bromide is excreted. It should be remembered in this connexion that the use of a salt-free diet in combination with bromide is equivalent to increasing the dose of bromide.

THE ORDER OF ST. JOHN

THE occurrence this week of the general assembly of the Order of St. John of Jerusalem reminds us of the close association between the Order and the medical profession, alike through the control of the ophthalmological hospital at Jerusalem and the organisation of the St. John Ambulance Brigade. After the religious service Sir John Duncan and Colonel J. L. Sleeman, respectively chief commissioners of the ambulance brigade and the brigade overseas, gave an account of the work of their departments during the past year. It was reported that nearly half a million calls upon the ambulance department at home had been made, including 17,000 motor accidents. A large number of patients had been carried by the motor ambulances of the brigade which has considerably extended the number of its divisions. The activities of the Order of St. John show that deep respect for medieval forms and formalities can accompany fine modern work for the public good.

A SERUM TEST FOR MALARIA

IN 1928 A. F. X. Henry showed that serum from cases of malaria had the capacity of flocculating melanin pigment, and that this property was apparently specific. This observation of Henry has received considerable support from the results of continental workers, but the form of melanin employed left much to be desired, since it was obtained from the choroid of an ox. Lieut.-Colonel E. D. W Greig, Dr. C. E. van Rooyen, and Mr. E. B. Hendry, working in the bacteriological department of Edinburgh University, have now succeeded in improving the technique of the test, and give a brief description of their method on another page. The melanin used by them is extracted from human hair readily obtained from the barber, and is in a stable colloidal solution, so that it can be put up in ampoules and applied in field tests. Sera from several cases of active and latent malaria respectively were found by the Edinburgh workers to give positive results, while out of 129 sera from non-malarial patients all except two proved negative. The future of this test will be watched with interest, as a trustworthy but relatively simple serum reaction for malaria would prove of great practical utility.

THREE professorial appointments in the British Post-Graduate Medical College, at Hammersmith, are announced in our news columns. Prof. F. R. Fraser and Prof. E. H. Kettle are leaving St. Bartholomew's Hospital to occupy the chairs of medicine and pathology respectively, and Dr. James Young is coming from Edinburgh to be professor of obstetrics and gynæcology.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED JUNE 16TH, 1934

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 3 (last week 2); scarlet fever, 2483; diphtheria, 1186; enteric fever, 13; acute pneumonia (primary or influenzal), 863; puerperal fever, 35; puerperal pyrexia, 105; cerebro-spinal fever, 20; acute poliomyelitis, 2; acute polio-encephalitis, 1; encephalitis lethargica, 4; *continued fever, 1 (Cambridge)*; dysentery, 5; ophthalmia neonatorum, 70. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on June 25th–26th was as follows: Small-pox, 5 under treatment, 0 under observation (last week 3 and 0 respectively); scarlet fever, 1571; diphtheria, 1671; measles, 1547 (last week 1750); whooping-cough, 283; puerperal fever, 24 mothers (plus 8 babies); encephalitis lethargica, 268; poliomyelitis, 2; "other diseases," 219. At St. Margaret's Hospital there were 19 babies (plus 8 mothers) with ophthalmia neonatorum.

Deaths.—In 121 great towns, including London, there was no death from small-pox, 1 (0) from enteric fever, 35 (11) from measles, 8 (2) from scarlet fever, 22 (7) from whooping-cough, 43 (11) from diphtheria, 43 (7) from diarrhœa and enteritis under two years, and 35 (4) from influenza. The figures in parentheses are those for London itself.

Bradford reported the only death from enteric fever. Liverpool reported 4 fatal cases of measles, Rochdale 3, no other great town more than 2. Four persons died of diphtheria at Liverpool, 3 at Bradford and at Leeds.

The number of stillbirths notified during the week was 251 (corresponding to a rate of 37 per 1000 total births), including 39 in London.

LONDON SCHOOL OF MEDICINE FOR WOMEN.—Prof. L. N. G. Filon, F.R.S., vice-chancellor of the University of London, will present the prizes of this school in the Albert Levy hall of the Royal Free Hospital at 3.30 P.M. on Wednesday, July 11th.

LONDON HOSPITAL MEDICAL COLLEGE.—On Tuesday next, July 3rd, the Queen is opening the new students' hostel attached to the London Hospital. A week later, on July 10th, Mr. Walter Elliot, M.P., the Minister of Agriculture, will distribute prizes in the medical college.

PROGNOSIS

A Series of Signed Articles contributed by invitation

VIII.—PROGNOSIS OF PERNICIOUS ANÆMIA

THE prognosis of pernicious anæmia is chiefly determined by the care and skill of the physician and the coöperation of the patient. The treatment of the disease is simple, but the penalty of inadequate treatment is severe. It is little advantage to a patient to be relieved of his anæmia only to develop paralysis later, but this has been the fate of many during the last ten years. Avoidance of this disaster does not require any special skill, but it does entail strict adherence to the rule that sufficient effective substance must be given to maintain the blood count constantly at a normal level. Intelligent patients often learn to estimate their own hæmoglobin and look after themselves efficiently. The majority need to remain under medical supervision, so that their hæmoglobin can be tested at least once every six weeks, and so that the onset of symptoms suggestive of subacute combined degeneration, such as paræsthesiæ or rheumatic pains in the limbs, can at once be countered by massive dosage of effective substance. If these precautions are taken, a patient with pernicious anæmia probably has the same expectation of life and physical well-being as his fellow men.

The immediate prognosis of pernicious anæmia is dependent on the severity of the anæmia and the presence of nervous or other complications. When the red cell count is below one million, the hold on life is always precarious and death may occur from syncope or from a trivial infection. Patients in this condition are to be regarded as medical urgencies, which demand prompt and vigorous treatment. The only treatment to be considered is the parenteral administration of liver extract, with or without transfusion of a pint of blood. The more experienced the physician, the less recourse will he have to transfusion, which is not free from risk in these collapsed patients. The ideal treatment in emergencies is probably the slow intravenous injection of 5 c.cm. of a reliable intravenous preparation of liver, followed by the daily intramuscular injection of 6 c.cm. of one of the intramuscular extracts. The intravenous injection should be given very slowly, preferably in about 20 c.cm. of warm normal saline solution. When the count is above one million red blood-cells per c.mm., transfusion and intravenous injections should be avoided and treatment confined to the injection of 2 to 4 c.cm. of an intramuscular extract daily. Improvement is usually visible in 24 to 48 hours and the patient should be out of danger of death from anæmia by the end of a week. Diminished resistance to infections, especially those of streptococcal origin, appears to persist until the red cells rise above three million per c.mm. Intensive treatment should therefore be continued until this level is reached, and the patient carefully sheltered from the risk of infection.

When the anæmia is complicated by infection, the outlook is grave and a guarded prognosis must be given. The blood picture is often atypical in certain features, and the response to the anti-anæmic principle may be inhibited by the infection. In these circumstances transfusion may become the treatment of choice. However ill the patient may be, hope of recovery should not be too soon abandoned; I have reported the case of a man in a relapse of pernicious anæmia who contracted staphylococcal septicæmia and recovered after a very severe illness in which six transfusions were given.

SUBACUTE COMBINED DEGENERATION

In an unfortunately high percentage of cases, especially those who have relapsed through omission of treatment after previous repair of the anæmia, the presenting symptom is not anæmia but subacute combined degeneration of the spinal cord. It is not my intention to minimise the gravity of this complication and it is obvious that nervous tissue which has been killed cannot be replaced. Nevertheless I do feel that the prognosis of subacute combined degeneration is often painted in too gloomy colours. All of us are familiar with the remarkable improvement which may occur after an attack of transverse myelitis or during a remission of disseminated sclerosis. The same improvement is possible in subacute combined degeneration. The stages of the lesion are, usually, subjective sensory involvement; objective sensory involvement with Rombergism and loss of vibration sense; ataxic paraplegia; and complete flaccid paralysis, usually complicated by infection of the urinary tract. Paræsthesia, like the lightning pains of tabes dorsalis, may be a troublesome symptom to overcome, persisting after the objective signs of spinal degeneration have disappeared; apart from this, sensory changes are relatively benign and complete recovery may occur, with the return of vibration sense and tactile sensibility. Spastic changes are more serious, but many completely paralysed patients have learnt to walk again, and in rare instances an extensor Babinski reflex may become flexor. Complete flaccid paralysis is usually a terminal event, and if the urine is also infected or bedsores are present, the very gravest prognosis should be given. The treatment of these spinal lesions is intensive parenteral liver therapy, with massage, re-education, and encouragement; large doses of iron may also be employed.

OTHER COMPLICATIONS

Apart from irreparable nervous changes, complete recovery should be made from an attack of pernicious anæmia, the hæmoglobin rising to 100 per cent. or higher and the patient feeling perfectly fit. If this happy consummation is not attained, search should be made for a complication. Of these the most important are iron deficiency, hypothyroidism, sepsis, and arterio-sclerosis.

Iron deficiency is probably more common in pernicious anæmia than we have hitherto appreciated. When regeneration of the blood takes place, the iron stores of the organism are soon depleted and may prove insufficient for complete repair of the anæmia. I have gradually swung over to the view that iron should always be given in pernicious anæmia in full doses by mouth until the hæmoglobin is normal, when it can be omitted.

Myxœdema, while not common, at times coexists with pernicious anæmia, and in such cases thyroid extract is necessary to restore the patient to complete health.

Focal sepsis is not given the same importance in the ætiology of pernicious anæmia as it was ten years ago, but there is no doubt that a septic focus may inhibit the response to liver treatment, and such a focus should be sought for in refractory patients. Refractoriness in other cases has been attributed to *arterio-sclerosis* and to disease of the liver. Some patients are certainly refractory, even though liver extract is administered parenterally. If the diagnosis of pernicious anæmia seems unquestionable, the indication is to give massive dosage of liver; C. R. Rhoads has described a patient who did not improve until 20 c.cm. of liver extract were injected daily by the intravenous route.

MAINTENANCE TREATMENT

With these reservations and qualifications, it should be possible to restore every patient with pernicious anæmia to complete health, and health should then be maintained indefinitely. The onset of subacute combined degeneration is always preventable if adequate treatment is given, as J. F. Wilkinson has so clearly shown in his large pernicious anæmia clinic in Manchester. Maintenance treatment with 1 oz. of desiccated stomach daily, or with the intramuscular injection of 2 c.cm. of liver at weekly or fortnightly intervals is now so cheap that failure to remain well is a reflection on the common sense of the patient or his adviser. Fear is sometimes expressed that the bone-marrow in pernicious anæmia may become aplastic and the patient may finally reach a stage in which he no longer reacts to liver therapy. This fear is groundless, for complete aplasia of the bone-marrow rarely if ever occurs in pernicious anæmia.

Sufferers from pernicious anæmia must ultimately die, even though they are cured of their anæmia, and evidence has been produced which suggests that they are more than ordinarily liable to succumb to carcinoma of the stomach. A. F. Hurst and others maintain that the achylia, which is the basic lesion of pernicious anæmia, is the result of gastritis from chronic irritation of the stomach, and they believe that this gastritis is sometimes a precancerous change, which terminates in a definite neoplasm of the stomach. The evidence for this theory is certainly suggestive, but not yet statistically convincing. After all, both achlorhydria and carcinoma of the stomach are common in the later decades of life, and we shall need to wait some years before we are persuaded that carcinoma of the stomach is commoner in patients treated for pernicious anæmia than in other men and women of the same age. It is wise for the physician to bear the possibility in mind and to attach special importance to the occurrence or recurrence of dyspepsia in a patient treated for pernicious anæmia. It would be wrong, however, to let the fear of malignant disease overshadow the success of the liver treatment, and at present I feel that the rather heroic programme of gastric lavage, suggested by Hurst to prevent the onset of carcinoma of the stomach in pernicious anæmia, is hardly justified.

SUBSTITUTION

Although I have spoken of the cure of pernicious anæmia, the treatment is essentially a substitution therapy, and the disease recurs when treatment is *omitted. In very rare instances complete cure* has taken place, the gastric secretion has returned to normal, and the patient has remained well without need for further treatment. This is so rare an event that it may for all practical purposes be disregarded in prognosis. Hurst has suggested that complete recovery of this type would be more frequent if septic foci were always removed from the mouth and throat, the stomach washed out as a routine, the diet kept bland, and the digestion aided by the prescription of hydrochloric acid. Most observers, however, are of the opinion that by the time pernicious anæmia develops the damage inflicted on the gastric mucous membrane is so extreme that there is little or no chance of its recovering the power of secreting the ferments which normally maintain the blood in a healthy state. Complete cure of pernicious anæmia will probably remain as rare as the complete cure of diabetes mellitus or myxœdema. To maintain health treatment must be continued indefinitely and with the utmost regularity.

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SPECIAL ARTICLES

LISTER INSTITUTE OF PREVENTIVE MEDICINE

(Concluded from p. 1310)

Work on Nutrition

DURING the last three years workers on *vitamin problems* in this Institute have devoted much time and attention to points connected with the standard adopted at the first meeting of the International Conference on Vitamin Standards and Units held in 1931. The subjects investigated have included the following:

Vitamin A: pure *crystalline carotene* as standard; influence on stability of temperature and of solvent used; the relative value of various methods of vitamin A estimation (Miss E. M. Hume and co-workers).

Vitamin B_1 (antineuritic): stability at different temperatures of the standard absorption product on acid fullers' earth from rice polishings (Miss H. Chick, D.Sc., Miss H. M. Jackson, and Mr. G. Prunty).

Vitamin C: suitability of pure ascorbic acid as standard *in place* of the fresh lemon juice previously recommended (Mr. S. S. Zilva, D.Sc., and co-workers). At the request of the Accessory Food Factors (Vitamins) Committee, the potency of ascorbic acid has been evaluated. The results obtained show that the activity of 1 mg. of ascorbic acid is equivalent to 20–30 international units (2–3 c.cm. of lemon juice).

Carotene as source of vitamin A.—Miss Hume and Miss H. Henderson Smith, in coöperation with Mrs. I. Smedley-MacLean, D.Sc., conclude, after testing specimens of coconut oil, which is used as a solvent for crystalline carotene, that the same sample of carotene dissolved in different samples of coconut oil does not always have the same biological value.

Recent researches have established the existence of many isomeric forms of carotene and of certain derivatives, all of which possess biological activity, the essential common factor being apparently the presence of an intact β-ionone ring with four conjugated double bonds attached. β-carotene differs from the other active *carotenes in having two such rings and in showing at least* twice their biological activity. It is necessary to establish more accurately the relative activity of β-carotene and that of the sample of carotene used as international standard, and also to ascertain the exact quantitative relation between the biological activity of pure β-carotene and the purest sample of vitamin A obtainable.

Effect of vitamin A deficiency on the eye.—Mrs. K. *Tansley Lythgoe, Ph.D. (Medical* Research Council grantee), has investigated the effect of vitamin-A deficiency on the development of the retina and of visual purple in young rats.

Mrs. Lythgoe's previous work had shown a delay in regeneration of visual purple to be one effect of vitamin A deficiency and the probable cause of the night blindness, characteristic of this dietary effect. The present work, still incomplete, indicates that defects in the structure of the retina and definite retardation of the first appearance of visual purple occur in suckling rats when the mother is suffering from a partial vitamin A deficiency. Evidence has also been obtained that administration of cod liver oil to young animals which have been deprived of vitamin A, restores the staining properties of the retina, but cannot repair any structural damage which may have occurred.

Vitamin D: origin and distribution in nature.—Miss A. M. Copping has continued her work on the origin of vitamin D in the ocean.

Further investigation of copepod material has shown that the dried material contained much more than 0·25 international units of vitamin D per gramme. This result would seem to afford a partial, if not complete, explanation of the rich depôts of vitamin D in the liver of the cod fish, which is said to feed largely on copepods at certain seasons of the year.

Evidence has been obtained that the vitamin D, which is abundantly formed when fresh green leaves are exposed to a powerful ultra-violet irradiation, tends to disappear when the material is kept, the rate of disappearance depending on the temperature.

Biological value of proteins.—Dr. Chick and Mr. J. C. D. Hutchinson have been studying the balance sheet method of studying the nutritive value of proteins.

In this method comparison is made of the relative values of proteins to maintain nitrogenous equilibrium in the adult rat. The special points of the study have been: the time required for "wash out" of residual nitrogen, when changing from high to low protein diets and vice versa; the influence of the level (proportion of total calories) at which the protein is present in the diet, the effect of heat and other agencies on the nutritive value of the protein. Most of the work has been done on caseinogen.

Pellagra.—The same workers have done experiments which provide another argument against the theory which would explain the association of endemic pellagra with the use of diets containing maize products as the staple cereal by an amino-acid deficiency in such diets. Dr. Chick and her collaborators have also examined the theory held by some authorities, that the occurrence of pellagra on diets composed largely of maize may be explained by a toxic substance contained in this cereal. Rats and mice have been reared on diets in which 90 per cent. of the calories was derived from maize products, without occurrence of any toxic symptom; nor were any deleterious effects noticed when the animals consuming these diets were exposed to ultra-violet or visible light from artificial sources.

BIOCHEMICAL INVESTIGATIONS

Calcification.—The mechanism of calcification in animal tissues has been further studied by Prof. R. Robison, F.R.S., and Dr. A. H. Rosenheim.

It has been shown that the second calcifying mechanism of hypertrophic cartilage is strongly inhibited by iodoacetate and by fluoride in very low concentrations. This suggests that the second mechanism, like the phosphatase, is enzymic in nature and that the two calcifying mechanisms may together form a complex enzyme system analogous to those of muscle and yeast.

In experiments with other tissues calcification was repeatedly obtained in aortæ of both rats and rabbits by prolonged immersion in highly supersaturated inorganic solutions. The deposits of calcium salts bore some resemblance to those described as occurring in these tissues in experimental hypervitaminosis D.

The oxytocic hormone of the posterior lobe of the pituitary gland.—The study of the chemical nature of the hormone has been actively pursued by Mr. J. M. Gulland, D.Sc., and his collaborators.

With Mr. T. F. Macrae he has begun experiments to identify the inactivating enzymes present in yeast and in trypsin preparations. They defined the criteria by which may be established the identity of a known enzyme which is suspected of inactivating the hormone. As a result of these researches it is apparent that the hormone is not proteinoid, as has been held hitherto by other investigators, but that, if it is peptide in character, its molecular weight is relatively small.

THERAPEUTIC SERA

Gas-gangrene antitoxin (B. welchii).—Within recent years an increasing interest has been taken in the serum treatment of acute peritonitis, intestinal obstruction and gangrenous appendicitis. The theory that has been formed attributes the characteristic toxæmia in these conditions to the action of the toxin of *B. welchii* and this view is supported by encouraging results that have followed the use of a specific antitoxin in this country. There are technical difficulties which complicate the methods of production of the serum. A fresh attempt has been made to simplify the preparation of the toxin and the antitoxin, and the results have been so consistently satisfactory that the methods can now be regarded as purely routine.

Serum for the treatment of poliomyelitis.—Coöperation with the Medical Research Council and the Public Health Department of the London County Council in the preparation and issue of a "convalescent" human serum for the treatment of poliomyelitis is being continued. The serum, when it has passed the necessary tests, is sent to the Western Fever Hospital, London, where early cases of the disease are admitted, and whence it is distributed for use in the treatment of patients who are in the preparalytic stage of the disease.

A new supply of serum from immunised horses has been obtained and found to possess very high virus-neutralising value in tests on monkeys. It is available for prophylactic use in contacts.

THE ECONOMICS OF MEDICAL PRACTICE IN CANADA

(BY A SPECIAL CORRESPONDENT)

THE medical profession in Canada is now grappling with some difficult problems, which have been intensified but by no means created by the economic depression. The conditions under which medical practice is carried on present features that have long been regarded by the profession as highly unsatisfactory, a view which for other reasons is shared by a large section of the general public, and the dissatisfaction has now reached a point at which even many who are ordinarily opposed to change are convinced that things cannot be suffered to remain as they are. The problems of medical service in Canada are in fact not unlike those in the United States, which have been described with great fullness of detail in the publications of the Committee on the Costs of Medical Care,[1] and they are ably summarised in an interesting paper read by Dr. Grant Fleming, professor of public health and preventive medicine in the McGill University, Montreal, at a joint meeting of the College of Physicians of Philadelphia and the American Academy of Political and Social Science held at Philadelphia on Feb. 7th last.

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[1] See THE LANCET, 1933, ii., 614, 667, 722.

CARE OF "INDIGENTS"

Perhaps the most urgent problem that now presses for solution is that of the medical care of the "indigents"—the transatlantic term for the destitute. Under the British North America Act the responsibility for providing medical care for the indigents devolves upon the respective provinces, but although some provision has been made it usually takes the form of a grant to hospitals on a per caput per diem basis for hospital maintenance, no fees for medical service being included. In Ontario the municipalities are legally required to appoint medical practitioners to treat patients who are "unable, through poverty, to pay for the necessary attendance, and who are not cared for in a public or private hospital." But, according to Prof. Fleming, many municipalities have not fulfilled this obligation, and the medical treatment of the indigent is left to the local doctors. He tells us that "the responsible authorities and the public in Canada have come to take it as accepted fact that the medical profession will give their services, without charge, for the medical care of the indigents."

As the depression deepened so the burden on the doctors increased, and their feeling that they were being unfairly dealt with became acute when the Dominion Government, deciding at last to give financial assistance to the provinces for the relief of the unemployed, announced that the assistance would be limited to a contribution towards the cost of food, shelter, and clothing. The Canadian Medical Association, in an interview with the Prime Minister of the Dominion, submitted strong reasons for their view that the federal contribution should include provision for medical care, but Mr. Bennett, though he agreed that the doctors should be paid for their services, said that payment should be made by the provinces and not by the federal Government. The provincial Governments, however, with the exception of Ontario, have declined to act without a contribution from the Dominion. The Government of Ontario undertake to pay two-thirds of the medical care of persons on unemployment relief if the local municipality pay the remaining third, and the doctors in the province have agreed to accept one-half of their usual fees. Where this scheme has been adopted it has worked well, but many of the municipalities have refused to adopt it, and much unpaid work is still done by the medical profession.

DEMAND FOR ORGANISATION

There are signs that the unfairness of the position in which the doctors are placed is becoming better appreciated by the public, who in many places have viewed with approval the efforts of the profession to secure payment for the medical care of the unemployed. But there are signs also of a growing feeling that the ordinary methods of obtaining medical care by private individual arrangements on a fee for service basis are unsuited to modern conditions. The cost of medical care in Canada as in other countries has steadily increased with the advance of medical science and the growing complexity of medical treatment, and the great majority of the population are unable out of their own unaided resources to afford adequate remuneration for medical services, at all events in a severe or prolonged illness. The public is feeling its way towards some system of paying for medical care by a pooling of individual resources.

One of the most remarkable of such systems is that adopted by the province of Saskatchewan by an Act passed in 1930, which enables a rural municipal council to frame a "by-law empowering the council to engage the services of a legally qualified medical practitioner for the municipality, at a salary not to exceed five thousand dollars per annum, and to submit the same to the electors for their approval." By June, 1933, full-time doctors had been appointed by 37 municipalities, part-time doctors by 30, and 9 municipalities had adopted the by-law but had not yet made an appointment. The Saskatchewan system, which is not limited in its operation to the care of the indigent, has spread to other provinces; municipal doctors have been appointed by five rural municipalities in Manitoba and by three in Alberta. The system appears to have worked satisfactorily on the whole, although the doctors would prefer that the conditions of medical appointments should be controlled by the provincial Governments; at all events the system has not been discontinued in any place in which it has been adopted. Free treatment for tuberculosis is available throughout Saskatchewan, and in 1920 the provincial Government began to give grants to expectant mothers. In 1931 the number of mothers receiving grants was 3020, and the total sum distributed among them was $64,116, of which $26,465 was expended on medical services, which were rendered by 1766 doctors. Unfortunately the maternity grants were discontinued in 1932 for reasons of economy.

COMPULSORY HEALTH INSURANCE

During the last few years the subject of compulsory health insurance has been much discussed in Canada, and special attention has been devoted to the British health insurance system, not with the object of finding out all that can be said against it—an attitude too frequently met with in medical circles in the United States—but from a genuine desire to profit by the experience gained by the 22 years of its operation. The first provincial Government to take up the study of the subject was that of British Columbia, which in 1929 appointed a Royal Commission on State health insurance and maternity benefits. The British Columbia Medical Association, in giving evidence before the Commission, advocated a system of compulsory health insurance which should provide a complete medical service, in which all qualified medical practitioners should have the right to participate, with free choice of doctor and payment per attendance. The Commission recommended the early establishment of compulsory health insurance in British Columbia, and the Government formed after the recent general election is pledged to introduce legislation giving effect to the Commission's recommendations.

The province of Alberta has also appointed a commission to study health insurance, and last year the commission issued an interim report stating that in their opinion: "Adequate medical services for all the people of Alberta can only be secured through the operation of a contributory health insurance scheme." The College of Physicians and Surgeons of Alberta, in laying their views before the commission, said that there was a wide divergence on the subject among the medical profession in Alberta, but added that "in our opinion a considerable majority of the profession in this province would welcome a scheme of State health insurance which would include certain important provisions"—the provisions being similar those formulated by the British Columbia Medical sociation. The Government of Alberta have nounced their intention of introducing a scheme of alth insurance during the present year at a cost of 3 per insured person.

In Manitoba and Quebec the question has also been idied by representative bodies of the medical ofession. In 1930 the College of Physicians and rgeons in Manitoba and the Manitoba Medical sociation appointed a joint committee to study ate medical services and their findings are similar those formulated in the British Medical Association's heme for a general medical service for the nation. Quebec compulsory health insurance has supporters the profession, but there seems to be a feeling that a scheme is introduced it should conform to the rench system, in which the doctor is paid direct r the patient.

The Canadian Medical Association have instructed eir committee on economics "to prepare a plan plans for health insurance to be passed to the arious provincial associations for their consideration, iticism, and suggestions." The object of the ssociation is to ascertain the considered views of the hole profession as a basis for action in any ontingency that may arise.

A CHANGE COMING

In Canada the profession, it seems, is approaching he subject of health insurance with an open mind, nd with a desire to learn what has been done in other ountries, and to profit by the experience of those ountries so far as it can be applied to Canadian onditions. The discriminating approval given to he British scheme by the British Medical Association as naturally had a considerable effect upon instructed pinion in Canada. Prof. Fleming believes that the vast majority of Canadian doctors now think "that a change is coming and that a not inconsiderable percentage want a change." He believes also that "the public are going to insist upon having medical care arranged for on some basis whereby they can pay for it without being unduly burdened."

It is to be hoped that Prof. Fleming will expand his paper and publish it in a form in which it will be readily available. The problems of medical service are pressing in many countries, and it will be a real help to all students of the question to know what Canada is thinking and doing to ensure that her people shall be provided with the medical care they need.

SCOTLAND

(FROM OUR OWN CORRESPONDENT)

EDINBURGH FOOT CLINIC

Lord Elphinstone, the new president, at the recent annual general meeting of this clinic declared open the newly completed theatre. The total number of treatments at the clinic during 1933 amounted to 13,633 against 10,362 in the previous year, patients coming from all parts of Scotland. Mr. Robert Stirling, in moving the adoption of the report, referred to the rough-and-ready chiropody practised during the late war when the rule was "burst the blisters and cut off the knobs" and every callosity which offended the æsthetic sense or caused discomfort was ruthlessly attacked with a razor. In the civil population, he said, they had people of all ages who threw undue stress upon their feet, ranging from the youngster who was starting work for the first time and who had to spend long periods standing, to those of sedentary occupation whose developed weight threw a great strain on the arches of the foot. It was, he said, admitted that the highest efficiency in any profession was to be found in the training centre, the best practice being carried out under the shadow of the academic walls. Attached to the foot clinic there was a school of chiropody with a two years' course of training, at the end of which students who satisfied the examiners were awarded the diploma of the Incorporated Society of Chiropodists. The school, he said, had a reputation second to none in the country, and the clinic had always worked in harmony with the medical profession. Lord Elphinstone said that to judge by the rapid development of the last ten years, it seemed inevitable that the clinic would soon require to be open every day and all day to cope with the work.

WELFARE OF THE BLIND

Under the new Act blind persons are entitled to the old age pension at 50 years of age, and local authorities have power to frame welfare schemes. The majority of them have in fact done so, and thanks to the vigorous administration of the Department of Health the care of the blind is one of the best organised services in Scotland. This year the Scottish National Federation for the Welfare of the Blind has met in Aberdeen, with representatives from some 200 centres. The Federation, which has a first-class home-teaching agency, might well take some definite steps to deal with prevention. The time is overdue for such a policy. The State is interested in prevention, since it cannot afford to lose the potential productivity of any of its citizens. Local authorities are interested because they have accepted the principle of increased aliment to the blind. Education authorities are interested, because of the heavy charge on them for the education and training of blind children. Industrial workshops and other organisations for the blind are finding their task increasingly difficult to provide work for their trainees. And the blind themselves, however successful in minimising the sense of handicap or disability, are insistent that their numbers should not be added to. A national committee with intent to reduce the causes of blindness should include officers of the federation, with representatives of government departments, local authorities, education authorities, the Association of medical officers of health, and ophthalmic societies. It might work along with the English committee or independently. Mr. Anderson, the representative of Edinburgh, was in favour of a Scottish preservation of sight committee. Dr. George Mackay, who is a member of the advisory committee appointed by the Department of Health under the recent Act, has prepared a pamphlet on the care of the eye, of which 20,000 copies have been circulated. The federation itself has brought out an illustrated leaflet in an edition of 14,000 copies. Hard words were said at the meeting about the practice of hawking cheap spectacles.

DENTAL DISEASE IN GLASGOW

At the forty-ninth annual meeting of the Incorporated Glasgow Dental Hospital Dr. J. Forbes Webster, dean of the hospital, said that Glasgow was the worst city in Britain for bad teeth. Dental caries was general among young people of 14 years and upwards. The dental profession had spent money in propaganda to educate the public, and had set aside a percentage of their funds for that purpose, but little progress would be made until the problem had been tackled from the time a baby was born. Volume for volume, the saliva in a dirty mouth contained more disease germs than ordinary sewage; that was why a man was fined 40s. if he spat in a corporation tramcar. During the past year 45,383 teeth were extracted at the hospital, but only 8235 —one out of every seven or eight—were preserved by conservation work. If only the cases came into their hands earlier the proportion of teeth saved could be greatly increased.

EXHAUSTION AND MENTAL DISORDER

In his annual report of Glengall Hospital, Ayr County, Dr. Douglas McRae states that 60 per cent. of the cases admitted during the year were found *in a seriously exhausted condition requiring anxious* nursing attention. This figure, which is the same as last year's, is in striking contrast with the 25 per cent. rate that prevailed before the war. Another unsatisfactory feature is the fact that, in 60 per cent. of the men and 50 per cent. of the women, the mental illness had been established for over a year before the patient was sent into hospital; the corresponding figures for the last pre-war year (1913) were 40 and 27. A study of the types of mental affection in the cases admitted during the year gives a curability of 33 per cent. (men 30, women 36), just half the number of possible recoveries among the admissions of 1909–1913. *Either there is twice as much incurable insanity* in the general community to-day compared with 25 years ago, or the delay in sending cases until a hopeless chronicity is established has doubled. Alcoholic excess was evident in 12 per cent. of the men and 4 per cent. of the women as compared with 51 and 10 in 1913. One gathers from the report that methods of treatment of early cases are well in advance of public opinion and possibly of private practice generally.

IRELAND

(FROM OUR OWN CORRESPONDENT)

A CENTRAL FEVER HOSPITAL

A LETTER from the Hospitals Commission to the Dublin county council announces an important decision. The Commission has been examining the facilities for the treatment of fevers in Dublin, and has arrived at conclusions which it proposes to embody in a recommendation to the Minister for Local Government and Public Health. A scheme is to be put forward for the concentration of the treatment of fevers in a central fever hospital, controlled by a board of management. This will be representative of the public bodies on whom lies the statutory duty of providing adequate treatment of fevers, and also of the board of Cork Street Fever Hospital which has hitherto been the principal agency in Dublin by which that duty has been discharged. It is suggested that the board of management should consist of seventeen members—seven to be appointed by the corporation of Dublin, three by the County Dublin County Council, and seven by the board of Cork Street Hospital. The Commission also proposes to invite the principal medical bodies to associate themselves in an advisory capacity with the board of management. A measure of agreement has been reached with the authorities of Cork Street Hospital by which they will contribute from their assets towards the upkeep of the new hospital.

The proposals of the Commission, if carried into effect, will cause a great improvement in the treatment of fevers in Dublin. The Cork Street accommodation has long been inadequate, and many of the buildings are unsuitable. Its work was supplemented by "fever wings" at several of the general hospitals, a system which was very convenient for clinical teaching, but did not tend to limit the spread of infection. Dublin may now look forward to a really modern fever hospital adequate to its needs.

UNITED STATES OF AMERICA

(FROM AN OCCASIONAL CORRESPONDENT)

PREOCCUPATIONS OF PUBLIC HEALTH OFFICERS

EVERY year the health commissioners of the various States meet with the provincial health officers of Canada and the officers of the U.S. Public Health Service in Washington. The conference held this year from June 4th to 8th constituted the thirty-second annual conference with the U.S. Public Health Service and the forty-ninth annual conference of the State and Provincial Health Authorities of North America.

Much attention was given to the nation-wide epidemic of amœbic dysentery, which originated (as described in THE LANCET of January 6th and April 7th) in Chicago during the World Fair. Dr. Herman N. Bundesen reported the measures taken to deal with the outbreak, and other speakers gave an account of the defective plumbing in the hotel whence infection spread. In the basement of this building were found cross-connexions between the condenser water-pipes of the CO_2 ice machines and the sewers; and there were also two leaks in the sewer-pipes from which sewage dripped directly into an open ice-water tank! The question arose why there had been no epidemic of typhoid fever under these conditions. The only plausible explanation is that the amount of residual chlorine in the city water supply was sufficient to destroy *Bacillus typhosus* but not the more resistant *Entamœba histolytica*.

The conference went on to record in favour of universal pasteurisation of milk in the following resolution carried *nem. con.*: "The conference recommends to the American people that all milk intended for *human consumption should be pasteurised.*"

The conference with the U.S.P.H.S. was welcomed personally by the Secretary of the Treasury (Hon. H. Morgenthau, Jr.) and was presided over by the Surgeon-General, Dr. Hugh S. Cumming, who described most profitably to the delegates his recent visit to England, and his investigation of the present administration of national health insurance in this country. Assistant-Surgeon-General C. E. Waller opened a discussion on the sanitary improvements that have been effected in various States through projects designed to relieve unemployment and subsidised by the federal government. In some of the southern States extensive and highly important drainage projects for the control of malaria have been carried through. Both there and elsewhere thousands of sanitary privies have been built, local funds supplying material, while the labour was paid from federal subsidy. These civil works projects, as they are called, have not, however, been everywhere equally successful. Sudden withdrawal of federal aid has left some communities with large stocks of material and no labour to make use of it. In other States projects have been undertaken independently of the State health department with unfortunate lack of skilled direction. Elsewhere again the State relief administration has proved less coöperative and sanitary projects have not been approved for subsidy. In general it was felt that in an emergency administration handling such vast sums of money and spending them so rapidly some defects in organisation were inevitable.

A discussion of the two types of small-pox was opened by a paper given by A. W. Hedrick, D.Sc., Johns Hopkins School of Hygiene. Dr. Hedrick recommended the separate notification of variola major and variola minor, but this recommendation was not very favourably received. It was felt that the distinction could not always be made; that classifying variola minor as a disease of secondary importance would lead to neglect in reporting it; that the assumption that only two strains of variola are in circulation is not yet justified.

THE SERVICES

INDIAN MEDICAL SERVICE ANNUAL DINNER

Sir Leonard Rogers presided at the annual dinner of the Indian Medical Service held at the Trocadero on June 20th, when there was a record attendance of 105 officers. There were present as guests, Mr. S. K. Browne, C.B., C.V.O., Mr. F. H. Brown, C.I.E. (*Times* Correspondent for India and the East), Dr. N. G. Horner (*British Medical Journal*), and Dr. Egbert Morland (*The Lancet*). Six officers on probation—Capt. A. A. Pullar, Lt. R. D. de Soldenhoff, Lt. R. L. H. Minchin, Lt. R. R. Prosser, Lt. T. K. White, and Lt. E. Parry—attended by invitation. The other members of the Service present were as follows:

Major-Generals: Sir John Megaw, K.C.I.E., H. R. Nutt, V.H.S., G. Tate, C I.E.

Colonels: H. Ainsworth, J. Anderson, C.I.E., R. F. Baird, Sir Samuel Christophers, C.I.E., O.B.E., F.R.S., J. K. Close, J. Crimmin, V.C., C.B., C.I.E., P. Dee, A. B. Fry, C.B., C.I.E., D.S.O., J. Fuller-Good, T. A. Grainger, C.M.G., C. R. M. Green, W. H. Leonard, C.B., K.H.P., F. P. Mackie, C.S.I., O.B.E., A. J. Macnab, C.B., C.M.G., J. McPherson, C.I.E., Sir Richard Needham, C.I.E., D.S.O., J. J. Pratt, Ashton Street, R. G. Turner, C.M.G., D.S.O., W. S. Willmore, C. N. C. Wimberley, C.M.G.

Lieut.-Colonels: W. G. P. Alpin, O.B.E., C. H. Barber, D.S.O., F. A. Barker, O.B.E., A. Buchanan, R. H. Candy, H. P. Cook, H. S. Cormack, M.C., D. Coutts, D. G. Crawford, J. M. Crawford, O.B.E., J. B. Dalzell Hunter, O.B.E., C. D. Dawes, C. Duer, H. R. Dutton, C.I.E., S. C. Evans, J. K. S. Fleming, C.B.E., C. A. Godson, M.C., G. F. Graham, V. B. Green-Armytage, A. F. Hamilton, C.I.E., J. B. Hanafin, C.I.E., H. Hingston, J. M. Holmes, E. V. Hugo, C.M.G., M. L. C. Irvine, S. P. James, I. Davenport Jones, H. C. Keates, H. Kirkpatrick, W. B. Lane, C.I.E., C.B.E., J. C. H. Leicester, C.I.E., I. M. Macrae, C.I.E., O.B.E., A. A. McNeight, E. C. G. Maddock, C.I.E., F. O. N. Mell, C.I.E., T. R. Mulroney, C. Newcomb, B. E. M. Newland, F. O'Kinealy, C.I.E., C.V.O., E. J. O'Meara, O.B.E., M. A. Rahman, H. Ross, C.I.E., D.S.O., W. S. J. Shaw, F. B. Shettle, O.B.E., G. M. C. Smith, C.M.G., W. C. Spackman, H. B. Steen, T. G. N. Stokes, H. Stott, O.B.E., J. Taylor, D.S.O., C. Thomson, E. O. Thurston, R. S. Townsend, M.C., A. G. Tressider, C.I.E., E. L. Ward, C.B.E., T. C. McCombie Young.

Majors: P. M. Antia, J. G. Bird, A. N. Bose, M.B.E., H. C. Brown, C.I.E., J. C. Chukerbuti, W. H. Crichton, J. A. Cruickshank, M.C., J. L. Donnelly, Sir T. Carey Evans, M.C., J. S. Galvin, N. H. Hume, G. R. McRobert, D. V. O'Malley, O.B.E., C. J. L. Patch, M.C., C. G. Seymour, E. A. C. Smith, H. Williamson, O.B.E.

Captains: D. C. Chopra, A. M. Fraser, R. T. Hicks, T. A. Malone, J. S. McMillan, Assa Singh, R. A. Wesson.

After giving the toast of The King-Emperor, the Chairman recalled the improvement in conditions of service in India during his lifetime, and his own efforts in the last five years as medical adviser to the India Office.

Sir Leonard Rogers said that to those like himself who entered the I.M.S. 40 years ago, pessimism about the future of the service might appear justified in so far as there were fewer opportunities for the favoured few in presidency towns to make small fortunes. But from the point of view of presenting favourable opportunities for good professional service he thought a much more optimistic view might be held. In some ways the conditions had improved: for example, on the military side, by the provision under the station hospital system of better conditions of work with increased responsibility and pay.

Another advance was in the provision of numerous whole-time and permanent medical research posts. Forty years ago there was not a single pure medical research laboratory in India except D. D. Cunningham's in Calcutta. Now good work of a practical nature was being done in the Bombay Plague Laboratory, in the Calcutta School of Tropical Medicine and in the Hygiene Institute built by the Rockefeller Foundation, in the plains in association with hospitals, and in the hill-top laboratories.

Sir Leonard went on to say that the I.M.S. did not lack good candidates to-day. He was convinced that, thanks very largely to the sympathetic backing of the India Office, the I.M.S. would maintain its traditions as the finest medical service the world had ever seen.

Sir John Megaw, in proposing The Chairman, omitted any reference to his researches, as they were common knowledge in the Service, but he recited the achievement of founding in Calcutta a research institute in the face of every possible pretext for economy and delay; an admiring business man had remarked to him: "Rogers ought to have been a company promoter." He spoke of physical activities in keeping with mental activities, which included bicycling in Bengal and catching a burglar with his own hand. His optimism for the Service was only justified, Sir John said, by the magnificent efforts which he had himself made. Towards the end of the dinner Col. J. Anderson achieved the impossible by telling some new stories and stimulated Col. P. Dee and Lt.-Col. F. O'Kinealy to tell others. The staff work of the dinner secretaries was gratefully acknowledged, Sir Thomas Carey Evans simply replying: "As long as you have enjoyed yourselves it is our reward."

ROYAL NAVAL MEDICAL SERVICE

Surg. Lts. to be Surg. Lt.-Comdrs.: L. J. Corbett and H. J. McCann.

The following appointments are notified: Surg. Lts. H. A. Clarke and H. E. B. Curjel to *President*, for Medical Dept., Admiralty.

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Lt. (D) W. R. Young to be Surg. Lt.-Comdr. (D).

The following appointments are notified:—

Surg. Lt.-Comdr. W. F. Lascelles to *Valiant*.

Surg. Lt. J. F. Heggie to *Leander*.

Proby. Surg. Lt. P. K. Fraser to *Victory* for R.N.B.

Proby. Surg. Sub-Lt. W. S. Miller to *Victory*, for R.N.B.

ROYAL ARMY MEDICAL CORPS

Maj. T. H. Twigg is restd. to the estabt.

ARMY RESERVE OF OFFICERS

Lt. P. R. Wheatley from R. Signals to be Lt.

INDIAN MEDICAL SERVICE

Temp. Lts. to be Temp. Capts.: M. Hafizuddin and K. V. R. Choudari.

Lts. W. M. E. Anderson, H. B. Wright, and J. Scott relinquish their prob. appts.

Lt.-Col. A. D. White retires.

ROYAL AIR FORCE

E. Donovan is granted a short service commission as Flight Lieutenant for three years on the active list.

Flight Lt. M. Pearson relinquishes his temporary commission on completion of service.

CONTROVERSIAL ISSUES

THE CASE FOR ABOLITION OF COMPULSORY VACCINATION OF INFANTS

THE efficacy of vaccination for the prevention of small-pox is, for all practical purposes, outside the field of medical controversy. Practical experience in the control of epidemics and the dispassionate examination of the records of outbreaks of the disease are alike convincing on the point. They likewise demonstrate that *infant* vaccination, no matter how thoroughly it may be done, merely shifts the age-incidence and reduces the total mortality among those who contract the disease ; it fails to afford protection against the spread of small-pox in a community. Indeed, it complicates the administrative control of the disease by increasing the proportion of abortive, and therefore undiagnosed, cases, since many of those who have lost complete immunity retain sufficient to modify the disease almost beyond recognition. The total incidence in a community of people vaccinated in infancy, but not revaccinated, may therefore be greater than among a completely unvaccinated population subject to the same vigorous epidemiological surveillance. Hypothetically, therefore, the total death-rate from the disease may be as high or higher, although the case-mortality is substantially reduced.

These comments are, of course, made with special reference to the disease in the virulent form which has come to be called variola major. They constitute the main if not the whole case, from the scientific point of view, against infant vaccination in a community exposed to a real and constant risk of infection with variola major, and it is not a very strong one. Under such conditions no security can be assured by any other means than universal infant vaccination and periodic revaccination.

The question which besets our minds is whether *the risk we run in this country* is really great enough to counteract certain other disadvantages of infant vaccination, especially under compulsion. We are now largely an unprotected people in this country by neglect of infant vaccination and by loss of the immunity of the vaccinated as the result of lapse of time—although allowance must be made for the probable immunising influence of the mild type of the disease, now called variola minor, during the last ten years. Yet, although variola major has found a footing in several parts of the country, it has failed to establish itself, with the exception of the Glasgow epidemic of 1920–21. This, of course, is no guarantee that it might not flare out under conditions of increased invasiveness and if the proportion of immunes were still further reduced. We have seen, however, that its administrative control is, on the whole, easier, especially at the outset of an epidemic, if it is not complicated by the modification brought about by remote vaccination. On balance, the danger does not appear to be so great as to justify the continuance of a measure to which there is a rooted objection, whether that objection is based on solid grounds or upon mere prejudice.

Is there, then, any valid argument of a medical nature against vaccination ? No reasonable person can deny that there is. Vaccinia causes a great deal of discomfort and a certain amount of malaise in an appreciable proportion of those subjected to it. It kills some of them. There is no reason to suppose that the Registrar-General's statistics in this connexion are subject to greater error than in relation to any other disease, and they show that 59 persons died of vaccinia in the ten years, 1923–32, in England and Wales. In the same period, when small-pox, in the form of variola minor, was exceptionally prevalent and several small outbreaks of variola major occurred, 226 persons died of the disease, or less than four times the number of deaths from vaccinia. The number of notified cases of small-pox (major and minor forms not distinguished) was 79,410, so that the case-mortality from small-pox was as low as 0·28 per cent. It is true, of course, that the fatality of vaccinia was far lower, for there were approximately 2,900,000 vaccinations, and the percentage case-mortality was therefore about 0·002. But the risk in vaccination is there. The larger the amount of vaccination the greater the actual number of deaths, and it is reasonable to question the right of a community to enforce it upon parents, when the other risk against which it protects the children—for a limited period of years—is so much less in total volume.

The people of this country have answered the question. Exemptions on the ground of conscientious objection have increased in number until they constituted 46·7 per cent. of all births in 1931. From 1905 to 1931 the percentage of vaccinations to births fell from 75·8 to 39·0. The decline has been continuous, with a slight interruption in the earlier years of the recent wave of variola minor, before the true character of that disease was generally realised either by the profession or the public. There is not the shadow of a prospect of a reinforcement of compulsion except in the face of a grave epidemic of variola major and then, if it were to be effective, compulsion would have to be extended to revaccination as well.

A law which is not observed is worse than no law at all. It would probably not be difficult to secure the vaccination of most of the present 39 per cent. of infants, without any power of compulsion. Undoubtedly, and naturally, compulsory vaccination when it was enforced created the attitude of antagonism to all forms of artificial immunisation which dies hard among the people. And yet it is upon such measures that we shall probably have to rely for the eradication of the air-borne diseases, such as diphtheria, scarlet fever (if it ever again becomes so severe in type as to make it worth while), measles, whooping-cough, and perhaps influenza. How can we expect parents to welcome the new prophylaxis, with its measured dosage and almost complete freedom from danger, if we continue to try—or pretend—to force them to accept the inoculation of a virus capable of multiplying itself and producing a lesion which may be the centre of pyogenic infection, and which has other fatal sequelæ ?

Compulsion there may have to be from time to time. We cannot be sure that variola major will always treat us lightly as it has during the present century. The Minister of Health has power to enforce vaccination at any time or in any part of the country by Orders made in terms of Sections 130 and 134 of the Public Health Act, 1875. In fact, it would be found that, in face of a real danger the people would demand vaccination and enforcement would be necessary to quite a limited extent. It will be said that many would contract the disease and die before they could be protected. They would also if every child was vaccinated, but not subsequently revaccinated, and much more so in our present state of pseudo-vaccination. In fact, with the modern organisation of the profession, the growth of health departments, and the establishment of clinics, vaccination of the whole community in a few weeks would not be an impossible proposition. It may more reasonably be argued that the production of the requisite quantity of lymph of the correct degree of maturity would present difficulties. It certainly would but, in practice, the country would be taken area by area, as the spread of small-pox—a disease with a comparatively long incubation period—is not rapid. The laboratories at the Ministry of Health have shown during the years 1923 and 1924 that rapid expansion of their output is possible. It will certainly be said that delay in vaccination will increase the risk of post-vaccinal encephalitis. That is the present view, although it seems to await confirmation. Some experience of the errors in death certification among young infants makes one a little sceptical on the point, and the complication is so rare that time is required for the gathering of sufficient data. In any case, it is not the most important of the fatal complications of vaccinia, and its importance would be relatively less in the presence of an invasion of variola major.

Generally, it is reasonable to maintain that the compulsory imposition of a procedure which involves some danger to health and even to life, however slight, is permissible only if it assures the protection of the community as a whole, and not merely the individual. Infant vaccination, without revaccination, affords no such herd protection. If obligatory vaccination is necessary it should include revaccination of those who have lost immunity. That, under ordinary conditions, is not practically attainable but, in circumstances of imminent risk, exercise by the Minister of his power to make such an Order would not be seriously opposed.

The truth of the matter is that compulsory vaccination against a hypothetical danger is an obstacle to the acceptance of immunisation against present risks. There would appear to be no hope of the widespread adoption of artificial prophylaxis against other diseases, so long as a living virus is associated in the public mind with the process and its use is even nominally enforced. The whole problem would be altered if a dead antigen for producing immunity against small-pox were discovered and vaccination thus brought into line with the more modern methods of prophylaxis. Even then compulsion would be more of a hindrance than a help.

THE CASE AGAINST THE ABOLITION OF COMPULSORY VACCINATION OF INFANTS

The question of compulsory vaccination was raised last year by the Council of the British Medical Association and a resolution calling for its abolition was sent to the annual conference where, however, an amendment was accepted and the Council was asked to consider the matter again. This reference back supported the contention of the meeting of the Association of Public Vaccinators whose members are regularly inside the homes of those directly concerned—that there is no general demand for any alteration of the law. Those who advocate abolition bring forward no solid argument but only a purely hypothetical assumption that entire freedom would act as a magnet towards vaccination. Experience on parallel lines entirely negatives this. What does compulsory vaccination mean in these days ? It means the possibility of exerting administrative pressure where needed by statutory officials. It does not interfere with those individuals who, however misguidedly, choose to "contract out" from vaccination by the conscience clause. It also means that there exists an organisation constituted by law which keeps in operation the machinery necessary for the control of small-pox. Remove the compulsory idea and there is nothing except small-pox to prevent the population from forgetting all about vaccination. It is only the regular visitation by administrative officers which counteracts this forgetfulness or indifference, and these officers will disappear if there is no law to administer. Is it not better to have the present average of 40 per cent. (in some places over 60 per cent.) of the infants coming along vaccinated, thus putting up a barrier, even though an incomplete one, rather than have no barrier at all against small-pox ? Most medical officers of health would feel much happier if they knew that there was a 40 per cent. barrier against, say, diphtheria. Backing away from compulsion will accelerate indifference and furthermore would be interpreted as meaning that vaccination was no longer necessary. The abolition of the compulsory clauses—which apparently is only called for by those behind the office desk or the laboratory bench, not by those who actually go into the homes of the people and are therefore in a much better position to judge the psychological attitude of parents to the matter—would mean that the whole matter would be left to a largely unthinking public. Though the main aspects of the question are (*a*) the municipal and (*b*) the domestic, yet the abandonment of compulsion would have both an international and a national bearing.

Internationally, if the abolition of compulsion means, as seems likely, the abandonment of all administrative pressure, the Public Health Committee of the League of Nations would find the balance of its work in connexion with the control of small-pox disturbed. One nation would have deserted and there would be a breach in the wall of solid defence which the near-by nations at any rate had set up. Their opportunities to gauge effects would be narrowed, and their orbit of observation curtailed, and this by the very nation which gave vaccination to the civilised world.

Nationally the abolition of compulsion might strain both social and commercial relations with other countries especially if small-pox continues. Moreover the steady work of the National Lymph Establishment would be unbalanced if it had only to hold itself in readiness for peak loads due to sudden outbreaks of small-pox, with only an infinitesimal weekly call and no returns bearing on the reactions of lymph. Would the nation feel happy in the knowledge that its field army of administrators and propagandists no longer existed ?—for without compulsion no army would be required.

Municipal outlook.—If the individual ceases to be protected, then greater protection must be provided for the community. Epidemics will come, and all must be in readiness. There was not long ago an outbreak in Lancashire of the severer type. It is much less costly to prevent by vaccination than to overtake by hospital isolation. Once having lost the idea of the force which compulsory administration implies, both vaccination and revaccination will be spurned, and the well-vaccinated towns will involuntarily be dragged down to the level of the others. Would this be fair ?

Domestic outlook.—As is well known, persons having a rooted objection to vaccination can "contract out" by making a statutory declaration. The remainder available for vaccination can be divided into three classes :

1. Those anxious to have it done.
2. The indifferent, who await the call of the vaccination officer and after explanation of the reasons for vaccination, agree.
3. Those who say they would rather not have it done at all, but have been remiss or too indolent to get exemption. Many of these also comply after explanation.

As a last resort the vaccination officer has still the power of enforcement though it is very rarely exerted. Under a voluntary system, vaccinations would be confined to a portion of the first category only and in the absence of a general atmosphere of vaccination some even of these might recant. The voluntary system would certainly add to the number of the unvaccinated the enormous mass of the indifferent and careless. Propaganda would depend entirely on the complexion of the local governing body.

Summarising then much that has been said above, the following observations may perhaps act as pointers as to why compulsory vaccination should be retained.

1. The removal of the atmosphere of compulsion even without its legal enforcement would in the opinion of those most likely to know immediately lead to a decrease in the number of vaccinations.
2. It is the general opinion of the vaccination officials who actually go into the homes of those concerned that the compulsory clause does not now prevent a single person from accepting vaccination.
3. Public vaccinators hear no suggestion that but for compulsion parents would accept vaccination. On the other hand they are frequently told that it ought to be compulsory.
4. Abolition would immediately influence many who now regularly accept vaccination. Parents would argue that if it is not compulsory it is not now necessary.
5. The abolition of domiciliary vaccination which the dropping of compulsion implies would remove the opportunity for interviews with parents, by means of which many have been satisfied of the value of vaccination. Clinics would not provide such opportunities, and health visitors, who would not regard vaccination as their first duty, would largely fail to carry conviction.
6. The suggestion that entire freedom of choice would increase the number of vaccinations is unsupported by past experiences. When the Royal Commission suggested a conscience clause it predicted that the number of vaccinations would increase ; instead there was an almost immediate drop in the numbers in some places. Every relaxation has been followed by a decrease.
7. Judged by the very few coming forward voluntarily for immunisation against diphtheria, a disease which is still regarded with awe by most people and is seldom absent in any community, vaccination against a rare disease is even less likely to be considered in the absence of small-pox or of propaganda.
8. Removal of compulsion will react detrimentally to progress in regard to other immunisations, for it will certainly be loudly proclaimed that vaccination—the sire of all immunisations—has been found to be useless, however untrue this may be.
9. The missing of vaccination in infancy, when the chance of harmful effects is infinitesimal, will defer the primary operation to a later period when at any rate it may give more discomfort, and, anyhow, according to the last Royal Commission, the greater possibility of danger.
10. In the opinion of practitioners and officers who go into the homes of the people, there is no general demand for abolition.

Finally, once abandon compulsion, which means live administrative domiciliary pressure, and there is nothing left but the dead hand of indifference. There can be no turning back.

PANEL AND CONTRACT PRACTICE

Insurance of School Leavers

THE possibility of extending health insurance to cover children from the time they leave school was considered in our issue of May 19th (p. 1086), where comments were made on a resolution of the Birmingham insurance committee which has been circulated for comment. The proposal has since been brought before the annual conference of the National Association of Trade Union Approved Societies, and this body has decided in its favour. The conference added a rider, however, that the whole of the contributions for children of 14–16 should be paid by the employer and the State—a suggestion which would place the beneficiaries in a privileged position. In the discussion it was stated that the Government had no intention of raising the school-leaving age, and that if Unemployment Insurance were to apply between the ages of 14 and 16 it was only fair that health insurance should also be available for the same period. Of the thousands under the age of 16 who were engaged in distributive occupations many, it was urged, were in need of medical attention but could not afford it. To this the reply might be made that growth and multiplication of public medical service schemes makes it untrue to say any longer that juvenile workers cannot afford medical attendance.

As yet, however, there seems to have been no official expression of medical opinion on the subject.

Change of Doctor

The regulations on change of doctor are still inconsistent with the wishes of the profession, which has always held that a disgruntled doctor and a dissatisfied patient are best parted as soon as may be. At present an immediate change can be effected only when both practitioners give their consent or when the patient moves outside the two-mile radius of his medical attendant's practice. When a patient wishes to change doctors, without consent and without moving, he has to give at least a month's notice before the beginning of each quarter. He writes to the insurance committee enclosing his medical card, and the committee returns the card with a slip (printed in red ink and gummed to the inside) authorising the change. He takes this card, with the slip in it, to the new doctor of choice, who signs it in accepting the patient for his list, and it has then to be returned to the insurance committee by the new doctor within seven days. After registering the transfer the committee sends the insured person a new card with the new doctor's name on it. The former doctor is responsible for medical treatment up to the time of effective change—i.e., the beginning of the quarter. But as the patient is dissatisfied with *him*—otherwise he would not have made the change—it is unlikely that he will go to him for advice, and the probability is that he will have to pay for medic[illegible]mand [illegible] necessary, obtained elsewhere.

It will be seen that one local transfer involves four postages, two of which are paid for by the insurance committee, and this gives much clerical work to the committee. The London insurance committee has recently published its latest figures both for local changes—i.e., without consent and without moving away—and for all kinds of transfer in the course of the last year.

Taking the local changes first, for the quarter ending March, 1934, out of 1,786,954 insured persons on the lists of medical practitioners and institutions there were 7031 requests for change of doctor (without consent or moving away); of these, however, only 4929 were effective, for 1576 were irregular 313 being attempted out of time. In other words about 40 out of every 10,000 insured persons request this local change of doctor but only 27 carry it out in every quarter.

When we consider all the changes—i.e., the total transfers effected for all reasons in the year March, 1933–4—we find that out of an average of 1,884,526 insured persons on the medical register there were 23,319 requests to transfer of which 17,167 were effective. Reducing these to simpler figures 124 out of every 10,000 insured persons request the transfer, and for 91 out of every 10,000 it is effected. The total number of transfers by consent for the years from March, 1930 to 1934 is 38,681—not quite 10,000 per year.

The regulations provide that, save chronic illness in which he is certifying incapacity once a month, a practitioner cannot give notice to the insurance committee to have his patient removed from his list as long as that patient is ill and receiving certificates of incapacity to work; but he can give notice at any other time. The reason for this regulation seems to be fairly obvious. There have, however, been two cases recently before a medical service subcommittee in which doctors have apparently tried to get rid of their responsibility to attend an ill insured person by saying to the relatives "I cannot come," "It is too far away" (although within two miles), "I never visit in that area," "Let me have the medical card and I will sign the consent to transfer and you can then get the services of an insurance doctor without having to pay."

Practitioners under the insurance scheme are paid a capitation fee to look after their patients whether they are well or ill and to seek to transfer a patient, directly he becomes ill, to some other doctor who has received nothing for him when well is definitely unjustifiable. There may, of course, be special and quite genuine reasons why Dr. B. cannot respond immediately to a call to see his patient Mr. P., but this does not make it permissible for Dr. B. to try to transfer the patient by consent to Dr. C., nor does it justify Dr. B. telling the relatives to try to get Dr. C. to attend. What he ought to do is ring up or send a note to Dr. C., asking him to attend Mr. P. on his behalf, and he should arrange to pay Dr. C. the proper fees for doing his work.

It often becomes obvious that a patient is never likely to get on well with his doctor. If so, the best plan is to give notice to have him removed from the list before there is any trouble.

OBITUARY

ARTHUR ANDREW MORRISON, C.M.G., M.D. Aberd.

WE regret to announce that the death occurred on June 14th of Dr. Arthur Morrison, lately British consular surgeon at Alexandria, and well known in Egypt through 50 years of work as doctor and public official.

Morrison was born in 1858 in Aberdeen and educated at the grammar school of that city and Marischal College. He graduated as M.B., C.M. in 1882, and in the following year went to Alexandria as assistant to the late Sir James Mackie. In 1886, the year in which he proceeded to the M.D. degree, he was nominated R.M.O. to the State Hospital at Suez, where he worked until 1891, when he rejoined Mackie in Alexandria, and a few years later succeeded him as British consular surgeon and delegate on the Quarantine Board. He was also appointed surgeon to the Deaconess Hospital, now and since the war known as the Anglo-Swiss Hospital. This hospital received many Australian sick on their arrival at the seat of war, while in 1915 the wounded in the Gallipoli campaign soon began to fill the beds. Morrison won admiration on all sides by the strenuous way in which he tackled the administrative difficulties, and by his great skill as an operating surgeon. At the conclusion of the war he organised the Anglo-Swiss Hospital as a modern British institution, furnishing a chemico-bacteriological department at his own expense, and when at the age of 70 he retired from practice with the distinction of C.M.G., he remained a medical director of the institution and retained his delegateship on the Quarantine Board. In memory of his wife, who was the daughter of Capt. W. H. Roberts, of Suez, and whom he married during his service at that port, he founded at the hospital an anti-rabies institute which has proved of great service to the country and which will constitute a fine tribute to his memory.

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[Photograph by [illegible]

ALAN DEED BRUNWIN, M.D., B.Chir. Camb.

THE death occurred in St. Thomas's Hospital, London, on June 21st, of Dr. A. D. Brunwin, a consultant tuberculosis officer for the county of Lancashire.

Alan Deed Brunwin was born at Rayne, Essex, in 1879, and was educated at Felsted and Trinity College, Cambridge. He went to St. Thomas's Hospital to finish his medical training, and graduated as M.B., B.Chir. in 1906. He proceeded to the M.D. in 1909, taking also the D.P.H. Aberd., and after certain resident appointments he entered the Colonial Service as Government M.O., Fiji. He recorded his experiences there by contributions to the medical press upon filariasis and dysentery, but his stay in the islands was brief, and before the war he returned to England to act as assistant medical officer at the Westmoreland Sanatorium. In 1913 he joined the medical staff of the Lancashire county council as consultant tuberculosis officer, the appointment being held jointly with the Blackpool corporation. He joined up at the outbreak of war as a temporary officer in the R.A.M.C., and was later attached as heart specialist to the base hospital at Etaples, where he did useful work on electrocardiography. At the cessation of hostilities he was given control of one of the five large dispensary areas in Lancashire, containing a special hospital for pulmonary diseases in that city with dispensaries at Preston and Chorley. With the coöperation of the late Dr. Logan Stewart he did interesting pioneer work in regard to the treatment of tuberculosis by artificial light at centres established in the tuberculosis dispensaries, the results of which he later published.

Dr. Brunwin will be greatly missed by his immediate colleagues and by the general practitioners of his district with whom he was always on friendly relations. He is survived by a widow and two children.

CORRESPONDENCE

INFANTILE DIARRHŒA

To the Editor of THE LANCET

SIR,—I was much interested in the paper by Dr. Maizels and Dr. Jean Smith in your last issue. The profession have been slow in recognising the importance of this subject. The authors say that the mortality in enteritis is over 50 per cent. I agree with this estimate, and would add that these cases do not do well in hospital; they are very liable to become infected with other organisms whilst in the overcrowded wards. It is, moreover, well known that enteritis cases are very apt to infect a whole ward of children which previously showed no symptoms of intestinal disturbance. I therefore think that these enteritis cases should be kept out of hospitals as much as possible and treated in the early stages in their own homes. Unfortunately the profession are not of one mind in regard to the principles of treatment. This is largely due to our ignorance of what is taking place in the child's body, and we should be grateful for any light which can be thrown on the problem by recent biochemical research. Acidosis no doubt exists, but the degree of acidosis does not seem to influence the prognosis in these cases. At what stage in the disease does the acidosis show itself, and how are we to diagnose the condition clinically? It is of course quite impossible to make elaborate blood examinations in the home; it is useless to examine the urine; and by the time the child becomes restless and has air-hunger the case is probably hopeless. One fact of practical importance that emerges from these researches is that normal saline must not be given, since this increases acidosis; half-normal saline can be safely given combined with glucose. This latter practice was adopted many years ago by the clinicians, and it is satisfactory to have this opinion confirmed by the biochemist.

Ten years ago I started a scheme in North Kensington for treating cases of acute vomiting and diarrhœa in their own homes amongst those who could not afford doctors' fees. Details of the scheme appeared in THE LANCET (1927, i., 176). It was made a notifiable disease, and with the help of the district nurses the scheme has worked very well. It seemed to me that as the child was losing so much fluid from its body, and as that fluid must come from the blood stream, the obvious thing was to introduce as much water as possible directly after the vomiting ceased, with the addition of sodium chloride, as this salt forms such an important constituent in the blood. I chose half-normal saline because this is more rapidly absorbed from the intestine than full-strength saline. Bottles full of saline were given to the infant during the first 24 hours; the child was encouraged to drink as much as possible; for instance, a baby 3 months old will take a pint of fluid in the 24 hours. One teaspoonful of castor oil was given, and the bowel was washed out with saline. The next day a food low in fat and high in sugar was given. I tried at first various foods, such as diluted lactic acid milk; this, however, was not easy to prepare in the home. Protein milk was fairly successful, but ultimately I hit on malted milk, which seemed to suit these cases better than anything else. It consists of water 3·7, protein 13·8, fat 9, carbohydrate 70·8; it is a mixture of desiccated milk, wheat flour, barley malt, sod. bicarb., and contains no unaltered starch. The child is generally kept on this mixture for five or six days, and then a very gradual return is made to a well-balanced diet. At first cow's milk is added to the malted milk in half-drachm doses. The greatest danger in these cases is to prolong starvation beyond the second day. I find it makes a great difference in the prognosis if the treatment is delayed beyond the third day of the illness. The prognosis is much more favourable if half-normal saline has been taken by the mouth instead of plain water. The dehydration is enormously relieved in the great majority of cases and temperatures of 103°–104° F. gradually subside.

It was encouraging to have my clinical experience confirmed by biochemical research. In a paper which appeared in THE LANCET (1930, i., 286) on Alkalosis in Congenital Hypertrophic Stenosis, Maizels, McArthur, and Payne described the examination of 34 cases, of which 28 had an increased bicarbonate reserve at some period before operation. They say the body has need of the chloride ion. In the vast majority of cases that I have seen the vomiting begins before the diarrhœa, as they are usually infants suffering from a dietetic cause, and are probably at first at any rate suffering from alkalosis and not acidosis; hence the success of treatment in these cases where vomiting is the prominent symptom. In this district the nurses have attended 836 cases in ten years; 8 of these died whilst the nurses were in attendance, and 26 died in hospital, making a total of 34 deaths, about 4 per cent. I cannot help feeling that the death-rate from enteritis could be very greatly reduced if some such scheme as this were adopted in large towns with a good district nurse service.

I have seen occasional outbreaks of dysentery, chiefly the Sonne variety; these cases are rarely fatal. The bacteriologist can of course help us in the diagnosis of dysentery, but in most cases of enteritis no specific organism can be isolated. I have seen a great number of post-mortems on these cases at St. Mary Abbot's Hospital; the most marked characteristic was the fatty degeneration of the liver and kidneys. Very often there was no sign of inflammation in the intestine. I have seen five cases of otitis media where the diarrhœa soon subsided after the appearance of pus from the ear. I do not regard otitis media as a cause of enteritis, but as a complication.—I am, Sir, yours faithfully,

Kensington, June 26th. RONALD CARTER.

RHEOSTOSIS

To the Editor of THE LANCET

SIR,—In her interesting paper on Familial Chondrodystrophy with Rheostosis (THE LANCET, Jan. 20th, 1934, p. 122) Dr. Gwenda Hilton mentioned that the condition of the long bones in her case differed from that first described by Léri and Joanny (1922) as "melorheostosis" in that it was bilateral and affected both upper and lower extremities. However, what I now believe to be a certain case of melorheostosis (or "rheostosis" as Dr. Hilton rightly prefers to call it) was brought before the Section for the Study of Disease in Children, Royal Society of Medicine, in May, 1920, by Dr. E. A. Cockayne (*Proceedings*, 1919–1920, xiii., 132–136) before Léri and Joanny wrote on the subject. In Cockayne's case the bone condition was *bilateral* and all four extremities were affected. The radiographic report stated: "Both femora show marked irregular thickening with formation of new dense bone throughout their length. There is a similar condition of osteitis in both humeri, especially in lower part; small local areas of thickening are present in both tibiæ and in one fibula; bones of forearms, hands and feet are normal." The Wassermann reaction in the blood of the patient (a boy, aged 9½ years) and in that of his father was negative (his mother was dead). The radiographic appearance in the femora is well illustrated by one of Dr. Cockayne's figures.

I had forgotten that Dr. Cockayne had described the case I am referring to when I first read Dr. Hilton's paper. I am, Sir, yours faithfully,

London, W., June 21st. F. PARKES WEBER.

HYDATID DISEASE OF THE LUNG

To the Editor of THE LANCET

SIR,—In your issue of June 16th (p. 1281) Dr. R. G. Prosser Evans advocates expectant treatment of pulmonary hydatid disease, and he records a case so treated which fortunately recovered. It is, I think, unfortunate that the views of H. Dew do not appear to have been considered. Basing his judgment on an unrivalled experience in Victoria, Dew insists upon early operative interference in all subpleural cysts and only countenances expectant treatment in the case of deeply situated parabronchial cysts which are neither large or causing toxæmia. "The prognosis after operations for simple pulmonary cyst is," he writes, "universally good and the mortality is under 5 per cent.; it is not so good in suppurating cases in which the mortality varies from 15 per cent. to 20 per cent." ("Hydatid Disease," Sydney. 1928). These results have been obtained by general surgeons without any other special experience in thoracic surgery.

The inference that the operative mortality in children is unduly high cannot be allowed to pass unchallenged. Although having no personal experience of hydatid disease, I have removed successfully a pulmonary lobe from a child aged 3 years and at present have under my care a girl aged 13 years who has survived, without serious inconvenience, a resection of the entire left lung carried out nine weeks ago. The view that young subjects, as a rule, tolerate major thoracic operations at least as well—if not better—than adults, is supported by the experience of Haight, Nissen and Rienhoff[1] who have performed successfully total pulmonectomies on children, aged 13, 8, and 3 years respectively.

Thoracic surgery has made, in this country, very slow progress, and gloomy views as to its scope are likely to prove a further check if undisputed. Otherwise criticism of Dr. Evans's interesting and instructive case would be unnecessary.

I am, Sir, yours faithfully,

GEORGE A. MASON.

Newcastle-upon-Tyne, June 20th.

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[1] Haight, C.: Surg. Gyn. and Obst., 1934, lviii., 768. Nissen, R.: Zentralb. f. Chir., 1931, lviii., 3003. Rienhoff, W. F.: Bull., Johns Hopkins Hosp., 1933, liii., 390.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

Royal Assent

IN the House of Lords on Friday, June 22nd, the Royal Assent was given to a number of Acts, including the Workmen's Compensation (Coal Mines) Act: the Statutory Salaries (Restoration) Act; and the Birmingham United Hospital Act.

Supply of Milk to School-children

The Milk Bill was considered by the House of Commons in Committee on June 19th. Captain BOURNE was in the chair.

Sir FRANCIS ACLAND moved an amendment to provide that not less than half of the moneys provided by Parliament should be expended in repayment to the Milk Board in respect of milk for consumption by children attending public elementary schools, or by mothers, or by children under school age attending clinics under schemes approved by the local public health authority.

After some debate.

Mr. ELLIOT (Minister of Agriculture) said that the proportion of money which they would spend for the purposes mentioned in the amendment was much more like six-sevenths than *one-half* or *two-thirds*. In view of this assurance he hoped that the amendment would not be pressed, because the mere existence of these words might be taken by the bodies concerned as an indication that the House of Commons desired them to reduce the amount of expenditure on milk for school-children, and so on, and to enlarge considerably the amount spent in milk publicity.

The amendment was withdrawn.

On the question that Clause 11 (Contributions from the Exchequer towards the expenses of milk marketing boards),

Mr. ELLIOT, replying to Sir S. Cripps, who asked for further information as to the expenditure of the money to be allocated under the clause, said that he intended to work on the schemes which had been in operation for some time under the National Milk Publicity Council. Those schemes, which were now supplying something like 900,000 children with milk, were working well and by building on the existing foundation they would have the benefit of previous experience. Milk was being supplied while the children were attending school and that was the line along which the initial arrangements, at any rate, would be made. The method was to supply a separate bottle to each child with a straw through which to consume the milk. That made sure of absolute cleanliness and of slow absorption of the milk, which made it more easily digested. They had set before themselves the ideal of at once halving the price charged to schools. Milk was at present supplied at one penny for one-third of a pint, and they hoped as soon as they got the sanction under this Bill to reduce that price for the milk to one half-penny. That would apply to all those who were already receiving milk and to all new entrants. They hoped that this would act as an excellent advertisement. The extent to which they could spread the milk at one half-penny depended on the arrangements the Board were able to make with the distributors.

The clause was ordered to stand part of the Bill.

The Committee stage was concluded and the Bill as amended was reported to the House.

Noxious Fumes in London Streets

In the House of Lords on Wednesday, June 20th, Lord KILMAINE called attention to the congestion of traffic in the London streets.

The Earl of DENBIGH said that one of the results of the awful congestion in the streets was the harm which was being done by the poisonous atmosphere. There were all sorts of regulations against cars being allowed to emit visible exhaust fumes, but what was the use of such regulations if nothing was done?

Earl HOWE said he did not believe that it was realised how much the air in the London streets was poisoned by exhaust fumes. He believed that the medical profession had carried out tests and they had found that there was an appreciable amount—he had heard quite high figures—of carbon monoxide in the blood of policemen who were employed in directing traffic. He believed that in New York they had attempted to tackle this matter and attempted to ventilate their streets through the drains and the sewers.

The Earl of PLYMOUTH, replying to the debate on behalf of the Government, said he would undertake to bring this matter to the notice of the Minister of Transport and he felt sure he would give it his consideration.

Public Health Services: Minister's Review

On Wednesday, June 20th, the House of Commons went into Committee of Supply on the Civil Estimates, Captain BOURNE, Deputy Chairman of Committees, in the chair.

On a vote of £13,639,924 for the salaries and expenses of the Ministry of Health.

Sir HILTON YOUNG (Minister of Health) said that this year there was an increase of £18,500 in the administrative expenses of the Ministry in connexion with slum clearance and rural water-supplies. There was an increase of £167,000 in respect of housing grants, and in respect of miscellaneous grants there was an increase of £199,000. Between the years 1919 and 1934 the Vote for the Ministry of Health had increased by the enormous figure of £58,000,000. Nearly half of the great increase in the vote had been caused by the De-rating Act. It had nothing to do with social services; it simply represented a change of expenditure from the local to the central pockets of the State.

Last year he dealt with the aspect of national health which was summarised in the word "nutrition," a matter in which it was difficult to give positive proofs. This year he would deal with the standard of national physique and health as shown by the incidence of disease in the country, and the resistance of the population to disease. On this matter it was possible to give very much more positive information, because it was reflected much more in actual figures. The most conclusive figure was the general death-rate, which was very sensitive to the general effects of epidemics and diseases. It took a sharp and marked rise in the influenza year of 1929. The general death-rate of the nation showed an encouraging downward tendency, which was the best proof of general maintenance of national health and physique. In comparison with five years before the standardised death-rate for 1932 stood 10 per cent. lower. That was an improvement in the death-rate after taking account of the fact that the population, owing to the falling death-rate, was annually getting older in its average age. The death-rate was a standardised death-rate which allowed for any increase in the age of the population. The next figure showed a more positive and encouraging result from the nation's great outlay of energy and money on health services, and that was the infant death-rate. During the last ten years, owing to the improvement in the infant death-rate, they had saved 40,000 more infants under one year than was the case at the beginning of the century, and the figures for the ten years at the beginning of the century were a great improvement on those of any preceding such period. This encouraging result was due, as the technicians said, to improvement in environment. The environment of an infant under one year was more than anything else its mother, and the improvement he referred to was, he believed, due basically to the improvement in the education of the mothers in the care of infants.

He offered a word of tribute to the magnificent work done by the 1340 antenatal clinics and the 2820 infant welfare centres. There was nothing which gave a firmer personal conviction of the value of health work than what one saw at these centres. Nor could he pass over the thousands of health visitors and nurses who carried from these centres the good work into the homes of the people. In the last fifteen years they had cut down the death-rate of children under 5 years of age from the three diseases most fatal to children—namely, bronchitis, diarrhœa, and measles—by more than one-half. If they looked not only to children but to adults they saw a good result from the faithful work of the medical profession and the hospitals, and of the administrators in the public health services over the whole field of local and central government. Where one person died of whooping-cough in 1932, nearly four died at the beginning of the century; where one died of diphtheria four died at the beginning of the century; where one died in 1932 of scarlet fever, over seven were dying at the beginning of the century. The most remarkable scientific result of all, attributable to the public health work, was shown by the fact that where one person died in 1932 of typhoid, the number who died at the beginning of the century was 22. The brilliant successes made in this field were shown whenever they came to outside carriers like water or milk, or some bug or insect, or food. The difficulties arose where infection was carried from person to person. It was known to science that there were constantly great waves of infection of these diseases passing through the public which never broke. The microbes were there and grew and declined, but the infection did not break in actual cases of disease. These waves were very difficult to check in order to stop a break of the disease. It followed from that, that since the difficulty of checking these diseases was greatest in cases where it was person to person infection; what they had to work on in order to prevent the diseases was to see that persons were not crowded too closely together. If they put their finger on overcrowding as an evil that clamoured for a national remedy they did so not only in a social sense, but in order to prevent disease. In the ten years up to 1933 the death-rate from tuberculosis had been decreased by 22 per cent. However far the success against tuberculosis was carried, they would never get rid of it until they finally got rid of the slums, which were the refuges of the disease.

The statistics as regards lunacy and mental deficiency might give a less favourable impression. The apparent increase in lunacy was deceptive, because it was a disease of advanced years; and it was probable that the increased average age of the population accounted for the increase of lunacy, rather than any actual increase of the disease. There had been an apparent enormous increase in mental deficiency, but this apparent increase was really due to better ascertainment. During the year there had been a most interesting and unanimous report on the difficult problem of sterilisation, and he was profoundly impressed by the strength of the reasons given by the committee in support of their recommendations as to sterilisation. As far as his own individual conscience was concerned he could see not the least difficulty in approving the recommendations of the Committee. But as regarded ministerial responsibility, they must remember that this was a novel question and one which had not yet been thought out by the mind and heart of the nation. At present, consideration was being given to the report by great organisations of national opinion, such as the churches. It would be wrong for him to propose any national policy in the matter until there had been sufficient time for the national mind and conscience to be cleared.

The maternity death-rate had not decreased like other death-rates during the last 20 years, and that was not satisfactory. They had obtained more knowledge of the question by intensive study, and they knew that the death-rate had not decreased owing to bad local patches in maternity welfare work. He urged the responsible authorities in those localities where the maternity death-rate was above the normal to follow up and intensify inquiries as to the cause of the local variation. There was an increase of 147 more antenatal clinics, and an increasing number of births now took place under the supervision of those clinics. There was also an increase in the number of maternity beds, and he wished to pay special tribute to the success of the London County Council in increasing their maternity service. The work done in connexion with the health services had been very much assisted by the systematic review of those services by the Ministry of Health. Two things were particularly sought in these reviews besides a general increase in efficiency. First they wanted to press forward with the movement inaugurated by the Act of 1929 for taking the treatment of disease out of the poor-law. Good progress had been made in the transfer of institutions dealing with ill-health from the public assistance to the public health committees in London, where 60 institutions had been taken out of the poor-law. Another great advantage was the specialising of institutions.

Referring to the drought, Sir Hilton Young said when the crisis was over they would profit by the experience of the great drought in order to see what could be done to insure against similar emergencies in the future.

The year had been one of tremendous activity in housing, and in particular with the slum clearance campaign. If this rate of acceleration was maintained they would achieve the programme of the White Paper in five years. But they must speed up the rate of demolition still more in order to reach that result. From his knowledge of the progress being made and the vigour which the local authorities were putting into the matter, he could say that unless there was any setback the rate of progress achieved encouraged one to believe that five years would see the programme substantially carried out. At the Ministry the town-planning and the housing work were now in a single department under an officer with the special status of Director of Housing. Forty thousand more houses were built in the half-year ended March 31st than in the preceding half-year, and 77,000 houses were built in the half-year for the lower-paid wage-earners. They were now building houses at the rate of 300,000 houses a year, and at the rate of 155,000 a year for the lower paid wage-earners.

Mr. GEORGE GRIFFITHS urged the Minister of Health to see that diabetic people who had fallen out of medical benefit should continue to get their insulin free, as they had done in the past.

Captain ELLISTON asked what the intentions of the Government were with regard to the British Post-Graduate Hospital and Medical School. He said that before the financial crisis of 1931 £250,000 had been voted for the provision and equipment of this hospital and school. After the crisis that sum was reduced to £100,000, but many leaders of British medicine hoped that now that the financial strain was less acute the Government would take a more liberal view of the possibilities in this connexion. They wanted to see in London a post-graduate medical school which was not only worthy of British medicine, but which would be a central rallying point for medical men from all parts of the Empire and the United States, which sent over hundreds of students every year to graduate in the medical schools of Paris, Vienna, Berlin, and Rome. They left London out because the teaching facilities here were so ill-organised and inadequate. There was in London material which would rival that of any capital in Europe.

The health departments of this country were so fully organised and equipped, and so ably administered, that there was very little more that could be done to increase their efficiency. It only remained to teach the public to make use of those facilities. He appealed to the Minister to advise local authorities that a small expenditure in education would mean a great saving in the cost of public health departments and in preserving the health of the people. It was a great hardship in the local government service that superannuation was in force in only some areas, and he urged that a measure enforcing universal superannuation for local government officers should be undertaken by the Government.

After further debate the further consideration of the Vote was adjourned.

Overhead Tramways and London Hospital

On consideration of the London Passenger Transport Board Bill, as amended by Select Committee, in the House of Commons on Wednesday, June 20th,

Dr. O'DONOVAN moved to leave out Clause 33 of the Bill, which gives power to work Aldgate to Grove-road tramway on the overhead system. He said that this tramway line ran through the biggest thoroughfare of London, having on one side the greatest hospital in London. It would be a pity if this clause should fasten upon the locality of Stepney a transport system which might be well suited to the large dormitory villages across the Lea, but trams should not be encouraged to carry these ancient trolleys up the fine Mile End-road. They would be noisy, and sleep was precious. This great road was already a road of slaughter, and the borough council and the people of the district felt that posts would not add to its safety.

Mr. JANNER said that it was not a light matter to interfere with a hospital such as the London Hospital.

Sir G. HAMILTON said that he knew that overhead equipment could be made practically silent. He was certain that if the London Hospital had any feeling against overhead equipment they would have let the promoters know.

Dr. O'DONOVAN said that he was a physician on the active staff of that hospital and his own patients slept in a ward aligned against the Mile End-road. If Sir G. Hamilton would offer new trams he would withdraw what he had said, but he knew these ancient vehicles.

Sir G. HAMILTON said that they were not dealing with the ancient trams, but with new overhead equipment. That equipment would not cause any noise which would disturb the patients of the London Hospital.

Dr. O'DONOVAN said that he would withdraw his amendment because there were other and constitutional means open to a borough council but not open to a Member of Parliament which could be employed to test the feeling of Parliament on this matter.

The amendment was by leave withdrawn and the Bill was read the third time.

The Milk Bill and Pasteurisation

On June 25th in the House of Commons the Milk Bill was considered on Report.

On Clause 9 (payments for securing pure milk-supply),

Sir S. CRIPPS moved an amendment giving the Minister of Agriculture and the Secretary for Scotland power to exercise the powers conferred on local authorities under the Diseases of Animals Acts, 1894 to 1927, or any orders or regulations made thereunder, in the case of default of any local authority. He said that there were counties where there was very little inspection of dairy herds, while in others it was more systematic. If this power was given it would be very valuable.

Mr. ELLIOT, Minister of Agriculture, said that the confusion that would be caused by saying that the Ministry of Agriculture should carry out a duty which normally belonged to a local authority would be the worst possible thing in the administration of this scheme.

After further debate the amendment was negatived by 209 votes to 49.

Noxious Fumes in London Streets

In the House of Lords on Wednesday, June 20th, Lord KILMAINE called attention to the congestion of traffic in the London streets.

The Earl of DENBIGH said that one of the results of the awful congestion in the streets was the harm which was being done by the poisonous atmosphere. There were all sorts of regulations against cars being allowed to emit visible exhaust fumes, but what was the use of such regulations if nothing was done ?

Earl HOWE said he did not believe that it was realised how much the air in the London streets was poisoned by exhaust fumes. He believed that the medical profession had carried out tests and they had found that there was an appreciable amount—he had heard quite high figures—of carbon monoxide in the blood of policemen who were employed in directing traffic. He believed that in New York they had attempted to tackle this matter and attempted to ventilate their streets through the drains and the sewers.

The Earl of PLYMOUTH, replying to the debate on behalf of the Government, said he would undertake to bring this matter to the notice of the Minister of Transport and he felt sure he would give it his consideration.

Public Health Services : Minister's Review

On Wednesday, June 20th, the House of Commons went into Committee of Supply on the Civil Estimates, Captain BOURNE, Deputy Chairman of Committees, in the chair.

On a vote of £13,639,924 for the salaries and expenses of the Ministry of Health.

Sir HILTON YOUNG (Minister of Health) said that this year there was an increase of £18,500 in the administrative expenses of the Ministry in connexion with slum clearance and rural water-supplies. There was an increase of £167,000 in respect of housing grants, and in respect of miscellaneous grants there was an increase of £199,000. Between the years 1919 and 1934 the Vote for the Ministry of Health had increased by the enormous figure of £58,000,000. Nearly half of the great increase in the vote had been caused by the De-rating Act. It had nothing to do with social services ; it simply represented a change of expenditure from the local to the central pockets of the State.

Last year he dealt with the aspect of national health which was summarised in the word " nutrition," a matter in which it was difficult to give positive proofs. This year he would deal with the standard of national physique and health as shown by the incidence of disease in the country, and the resistance of the population to disease. On this matter it was possible to give very much more positive information, because it was reflected much more in actual figures. The most conclusive figure was the general death-rate, which was very sensitive to the general effects of epidemics and diseases. It took a sharp and marked rise in the influenza year of 1929. The general death-rate of the nation showed an encouraging downward tendency, which was the best proof of general maintenance of national health and physique. In comparison with five years before the standardised death-rate for 1932 stood 10 per cent. lower. That was an improvement in the death-rate after taking account of the fact that the population, owing to the falling death-rate, was annually getting older in its average age. The death-rate was a standardised death-rate which allowed for any increase in the age of the population. The next figure showed a more positive and encouraging result from the nation's great outlay of energy and money on health services, and that was the infant death-rate. During the last ten years, owing to the improvement in the infant death-rate, they had saved 40,000 more infants under one year than was the case at the beginning of the century, and the figures for the ten years at the beginning of the century were a great improvement on those of any preceding such period. This encouraging result was due, as the technicians said, to improvement in environment. The environment of an infant under one year was more than anything else its mother, and the improvement he referred to was, he believed, due basically to the improvement in the education of the mothers in the care of infants.

He offered a word of tribute to the magnificent work done by the 1340 antenatal clinics and the 2820 infant welfare centres. There was nothing which gave a firmer personal conviction of the value of health work than what one saw at these centres. Nor could he pass over the thousands of health visitors and nurses who carried from these centres the good work into the homes of the people. In the last fifteen years they had cut down the death-rate of children under 5 years of age from the three diseases most fatal to children—namely, bronchitis, diarrhœa, and measles—by more than one-half. If they looked not only to children but to adults they saw a good result from the faithful work of the medical profession and the hospitals, and of the administrators in the public health services over the whole field of local and central government. Where one person died of whooping-cough in 1932, nearly four died at the beginning of the century ; where one died of diphtheria four died at the beginning of the century ; where one died in 1932 of scarlet fever, over seven were dying at the beginning of the century. The most remarkable scientific result of all, attributable to the public health work, was shown by the fact that where one person died in 1932 of typhoid, the number who died at the beginning of the century was 22. The brilliant successes made in this field were shown whenever they came to outside carriers like water or milk, or some bug or insect, or food. The difficulties arose where infection was carried from person to person. It was known to science that there were constantly great waves of infection of these diseases passing through the public which never broke. The microbes were there and grew and declined, but the infection did not break in actual cases of disease. These waves were very difficult to check in order to stop a break of the disease. It followed from that, that since the difficulty of checking these diseases was greatest in cases where it was person to person infection, what they had to work on in order to prevent the diseases was to see that persons were not crowded too closely together. If they put their finger on overcrowding as an evil that clamoured for a national remedy they did so not only in a social sense, but in order to prevent disease. In the ten years up to 1933 the death-rate from tuberculosis had been decreased by 22 per cent. However far the success against tuberculosis was carried, they would never get rid of it until they finally got rid of the slums, which were the refuges of the disease.

The statistics as regards lunacy and mental deficiency might give a less favourable impression. The apparent increase in lunacy was deceptive, because it was a disease of advanced years ; and it was probable that the increased average age of the population accounted for the increase of lunacy, rather than any actual increase of the disease. There had been an apparent enormous increase in mental deficiency, but this apparent increase was really due to better ascertainment. During the year there had been a most interesting and unanimous report on the difficult problem of sterilisation, and he was profoundly impressed by the strength of the reasons given by the committee in support of their recommendations as to sterilisation. As far as his own individual conscience was concerned he could see not the least difficulty in approving the recommendations of the Committee. But as regarded ministerial responsibility, they must remember that this was a novel question and one which had not yet been thought out by the mind and heart of the nation. At present, consideration was being given to the report by great organisations of national opinion, such as the churches. It would be wrong for him to propose any national policy in the matter until there had been sufficient time for the national mind and conscience to be cleared.

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Sir G. Hamilton said that they were not dealing with the ancient trams, but with new overhead equipment. That equipment would not cause any noise which would disturb the patients of the London Hospital.

Dr. O'Donovan said that he would withdraw his amendment because there were other and constitutional means open to a borough council but not open to a Member of Parliament which could be employed to test the feeling of Parliament on this matter.

The amendment was by leave withdrawn and the Bill was read the third time.

The Milk Bill and Pasteurisation

On June 25th in the House of Commons the Milk Bill was considered on Report.

On Clause 9 (payments for securing pure milk-supply),

Sir S. Cripps moved an amendment giving the Minister of Agriculture and the Secretary for Scotland power to exercise the powers conferred on local authorities under the Diseases of Animals Acts, 1894 to 1927, or any orders or regulations made thereunder, in the case of default of any local authority. He said that there were counties where there was very little inspection of dairy herds, while in others it was more systematic. If this power was given it would be very valuable.

Mr. Elliot, Minister of Agriculture, said that the confusion that would be caused by saying that the Ministry of Agriculture should carry out a duty which normally belonged to a local authority would be the worst possible thing in the administration of this scheme.

After further debate the amendment was negatived by 209 votes to 49.

Sir A. WILSON moved the following amendment:

For the purposes of this Act the words "pure and free from the infection of any disease" means milk which has: (*a*) not been treated by heat in such a way as to destroy or modify its natural characteristics and to which no foreign matter such as water, skimmed milk, fat, or other substances have been added, and is (*b*) of a standard of bacteriological purity and of nutritional content which shall be fixed from time to time by the Minister of Agriculture and the Minister of Health after a public inquiry at the cost of the Milk Marketing Board.

He said that the amendment proposed first to exclude pasteurised milk or milk treated in other ways from the scope of the Bill and from the scope of milk to receive subsidy from Government funds. The Hopkins Report on which he pinned his faith was exceedingly lukewarm in its references to pasteurisation. It avoided saying that it was beneficial.

Sir FRANCIS FREMANTLE said he thought they were all agreed that they did not want pasteurisation to be used in order to give the people bad or unclean milk in any other way. They all agreed that they would infinitely rather that the children should have pasteurised milk than milk which contained the germs of tuberculosis and other diseases which they knew produced fatal diseases and resulted in the deaths of 2500 children every year. Pasteurisation was only the second best, but it was much better to have a second best than something which was worse. He did not think the amendment was required.

Mr. SKELTON (Under-Secretary of State for Scotland) said that if the amendment was accepted it would go far to prohibit the pasteurisation of milk. There was no intention that any development of pasteurisation should take the place of the cleaning up of the herds so far as this clause was concerned. It might well be that under this Bill it would be worth while to make some investigation into the proper method of pasteurisation. The main method in which the money would be spent, however, would be in the cleaning up of the herds. To make the granting of money for the purpose of cleaning up the herds dependent on the milk reaching a particular standard of bacteriological purity and nutritional content seemed to take them very far away from the vitally important purpose of this clause. He asked that the amendment should not be pressed.

Sir A. WILSON withdrew his amendment.

The Report stage of the Bill was concluded.

HOUSE OF COMMONS

National Health Insurance: Children Leaving School

WEDNESDAY, JUNE 20TH

Captain FULLER asked the Minister of Health if he would consider the desirability of amending the National Health Insurance Act so as to include all persons within its scope who, on leaving school, would enter into insurable employment at 14 under the new Unemployment Bill.—Mr. SHAKESPEARE (Parliamentary Secretary to the Ministry of Health) replied: I would refer my hon. friend to the reply given to a similar question on April 19th last.

Mr. RHYS DAVIES: Is the hon. Member aware that a large number of associations which have considered this problem have recently decided to make representations to the Ministry on the urgency of bringing these children within the national health insurance scheme; and will he look into the matter once again?

Mr. SHAKESPEARE: We shall certainly consider all representations that are made.

Diphtheria Immunisation

Mr. GROVES asked the Minister of Health how many cases of diphtheria and deaths from that disease had occurred in Dewsbury in immunised children since immunisation was first started in that town; and how many months had elapsed since the last inoculation before diphtheria developed in these cases.—Sir HILTON YOUNG replied: According to information furnished by the local authority, the number of cases of diphtheria and deaths therefrom occurring in "immunised" children was in—

	1932.	1933.	1934. Jan. 1st to June 13th
Cases ..	13	26	23
Deaths ..	4	2	3

The following Table shows the length of time which elapsed between the date of last inoculation and the *development of the disease*:—

Months.	1932.	1933.	1934.	Months.	1932.	1933.	1934.
2	3	—	—	13	—	1	—
3	3	3	—	14	—	2	2
4	2	2	1	15	—	3	—
5	3	—	1	16	—	—	1
6	2	1	—	17	—	—	3
7	—	1	—	18	—	5	—
8	—	3	—	19	—	1	1
9	—	2	—	20	—	1	1
10	—	—	—	21	—	—	5
11	—	—	3				
12	—	1	5		13	26	23

THURSDAY, JUNE 21ST

Sale of Contraceptives to Poor Persons

Mr. POTTER asked the Minister of Health whether at any of the centres established under his regulations contraceptive appliances were supplied at reduced prices or at the public expense to poor patients.—Sir E. HILTON YOUNG replied: I have not made any regulations on this subject, but have indicated to local authorities the extent to which, as I am advised, they are empowered under the statute law to make arrangements for the giving of contraceptive advice at institutions provided by them. The question of making a charge for any appliances supplied *by the local authorities is a matter within their discretion* and I have no complete information on this subject.

Mr. MOLSON: Would it be impossible for the Minister without legislation to relax the conditions which at present apply?

Sir HILTON YOUNG: That would depend upon the proposed relaxations. If the hon. Member has any in mind perhaps he will give me an opportunity of learning his views on the subject.

Appointments

City of London Maternity Hospital: GILBERT, BARTON, M.B., B.S. Lond., Resident Medical Officer; BERGER, B., M.B., B.Ch. Edin., Assistant Resident Medical Officer.

DATNOW, MORRIS, M.D. Liverp., F.R.C.S. Edin., M.C.O.G, Honorary Assistant Gynæcologist to the Royal Southern Hospital, Liverpool.

DUNBAR, J., M.B. Ch.B. Glasg., Surgeon at the Glasgow Roya Infirmary, Lecturer in Clinical Surgery at the Glasgow University and Hon. Consulting Surgeon to the Victor Infirmary, Helensburgh.

HEARN, R. J., M.D. Camb., assistant deputy corner for Cent District of London.

KNOTT, F. A., M.D. Lond., M.R.C.P. Lond., D.P.H., Dire of Bacteriological Department and Lecturer in Bacteriol Guy's Hospital.

London Fever Hospital.—The following appointments announced: WILLCOX, Sir WILLIAM, M.D., F.R.C.P. Lo and LAKIN, C. E., M.D., F.R.C.P. Lond., F.R.C.S. E Senior Physicians; HUNT, T. C., D.M. Oxon, M.R. Lond., and SMITH, K. SHIRLEY, M.D., F.R.C.P. Lo *Assistant Physicians.*

MACDONALD, GEORGE, M.B. Edin., D.P.H. Lond., Med Officer of Health to the Borough of Battersea.

MCGIBBON, J. E. G., M.B. Lond., D.L.O. Eng., Honorar Laryngologist and Aurist to the Royal Southern Hospital Liverpool.

Manchester Royal Infirmary.—The following appointments ar announced: BRYCE, A. GRAHAM, M.D. Manch., F.R.C Eng., Honorary Assistant Surgeon; BOLTON, N. M.B. Manch., F.R.C.S. Eng.; HOLT, R. L., M.B. Manc F.R.C.S. Eng.; SIMMONS, H. T., M.B. Manch., F.R.C.S. E WATKINS, K. H., M.B. Manch. and Lond., M.S. Lo F.R.C.S. Eng., Chief Assistants to the Surgical Units.

UNDERWOOD, E. A., M.B. Ch.B. Glasg., D.P.H., Medical Offic of Health, Shoreditch.

WYATT, R. B. H., M.B. Birm., D.P.H., deputy coroner fo Central District of London.

MEDICAL NEWS

University of Oxford

On June 21st the degree of D.M. was conferred on I. E. Harding.

University of Cambridge

On June 19th the degree of B.Chir. was conferred on S. J. Hadfield.

Dr. O. A. Trowell, university demonstrator in physiology, has been elected a fellow of St. John's College.

At recent examinations the following candidates were successful:—

THIRD EXAMINATION FOR M.B., B.CHIR.

Part I.: Surgery, Midwifery, and Gynæcology.—A. G. V. Aldridge, T. G. Armstrong, K. C. Bailey, R. H. Bailey, G Bates, H. H. Bayley, D. A. S. Blair, C. H. T. Bond, J. G. Chappel, L. A. Collins, F. H. Culshaw, F. J. Curtis, R. H. Dale, T. M. Daniel, S. M. Davidson, H. E. Dimsdale, W. H. Ekin, F. I. Evans, J. D. Fergusson, H. A. Hamilton, W. H. C. M. Hamilton, J. W. Hannay, E. E. Harris, G. R. Hawkes, N. G. Hulbert, R. M. Jones, A. M. Lester, F. D. M. Livingstone, E. B. McDowall, K. W. Martin, R. S. Morris, J. H. Moseley, W. S. Nutt, N. C. Oswald, J. R. Owen, A. R. Pope, M. S.-M. Rayner, J. S. Ross, A. G. Salaman, S. K. Sen, D. A. Smith, L. W. Spratt, R. J. Still, F. B. Turner, R. W. D. Turner, P. A. Walford, J. H. Walters, W. H. C. Watson, N. Whittaker, and W. F. Young.

Part II.: Physic, Pathology, and Pharmacology.—R. H. Bailey, A. M. Barrett, C. H. D. Bartley, H. H. Bayley, R. L. Benison, A. T. Blair, T. B. L. Bryan, R. C. F. Catterall, C. M. Cavell, J. R. Chambers, A. C. E. Cole, J. Collinson, J. G. Connell, A. H. Dunkerley, J. F. Edwards, C. E. Elliott, W. A. Elliott, F. I. Evans, S. M. Evans, J. D. Fergusson, R. I. N. Greaves, G. D. Hadley, E. A. M. Halsted, L. A. Hawkins, J. D. Hay, G. T. Hindley, N. G. Hulbert, A. Innes, B. S. Jones, R. A. Ke[illegible]en, A. M. Lester, R. E. K. Levick, M. W. Lloyd Owen, C. [illegible] Martin, L. C. Martin, M. K. Martyn, H. B. May, W. G. Q. Mil[illegible] G. S. W. Organe, B. H. Page, C. G. Pantin, C. G. Parsons, J. P. S. Peck, G. T. Pitts, T. A. Ratcliffe, W. F. Richards, M. A. Rugg-Gunn, S. B. H. Saunders, T. L. H. Shore, M. S. Spink, R. J. Still, D. J. Thompson, A. S. Till, R. W. D. Turner, J. H. Walters, G. L. Ward, M. Williams, H. W. Williamson, W. H. Wilson, and R. M. Yeo.

University of London

At a meeting of the senate on June 20th Prof. L. N. G. Filon, F.R.S., was re-elected vice-chancellor for the year 1934–35. It was resolved that on foundation day, 1934, honorary degrees should be conferred, among others, on Prof. Karl Pearson, F.R.S., and Sir Cooper Perry, M.D.

Three chairs at the new British Postgraduate Medical School were filled by the appointment of Dr. F. R. Fraser as professor of medicine: Dr. James Young as professor of obstetrics and gynæcology: and Dr. E. H. Kettle as professor of pathology. The appointments are dated from October 1st or as soon thereafter as may be practicable.

Dr. Fraser, who is at present university professor of medicine St. Bartholomew's Hospital, was born in 1885 and educated Edinburgh Academy and Christ's College, Cambridge, where obtained first-class in the natural sciences tripos (Part I . graduated in medicine at Edinburgh in 1910, and was appointed assistant in medicine at the hospital of the Rockefeller Institute, New York, in 1912, and assistant physician to the Presbyterian Hospital in 1914. After serving in France and at the Hampstead Heart Hospital he became consulting physician to Rhine Army. In 1920 he was appointed assistant director the medical professorial unit at St. Bartholomew's Hospital, later in the same year he succeeded Sir Archibald Garrod as director. In 1925 he re-visited the medical schools in U.S.A. Canada at the invitation of the Rockefeller Foundation, in 1927 gave the Goulstonian lectures of the Royal College of Physicians of London, taking as his subject cardiac dyspnœa. 1928 he lectured in Australia at the invitation of the Melbourne Postgraduate Com[illegible] again visited the United [illegible] Vanderbilt University. was [illegible] Commission till 1933. [illegible] rature have related to [illegible], heart disease, and exophthalmic goitre.

Dr. Young is obstetric physician to the Edinburgh Royal Maternity Hospital and gynæcologist to the Edinburgh Royal Infirmary. Born in 1883, he was educated at Heriot's School and the University of Edinburgh, where he graduated M.B. medicine in 1905. He obtained the fellowship of the Royal College of Surgeons of Edinburgh in 1908, and he has been a fellow of the British College of Obstetricians and Gynæcologists from its foundation. Since 1920 he has been lecturer in clinical obstetrics and gynæcology in the University of Edinburgh. "Textbook of Gynæcology" is now in its third edition and he collaborated with Munro Kerr, Haig Ferguson, and James Hendry in the "Combined Textbook of Obstetrics and Gynæcology." Dr. Young has devoted his attention specially to maternal mortality, and in collaboration with Prof. Miles Phillips and Dr. W. H. F. Oxley he wrote the section on the maternity services of Holland, Denmark, and Sweden, in the final report of the Departmental Committee on Maternal Mortality and Morbidity. For many years he has carried out investigations into the toxæmias of pregnancy and he has written a book incorporating the results of research on histological changes in the uterus during menstruation and pregnancy. During the war years he served in the Royal Army Medical Corps, and for some time was lieut.-colonel in command of a field ambulance in the 52nd Division. He was awarded the D.S.O.

Dr. Kettle has been university professor of pathology at St. Bartholomew's Hospital for the past six years. Born in 1882 he entered St. Mary's Hospital from Skipton School in 1901, and graduated as M.B. Lond. in 1907. After four years as pathologist to the Cancer Hospital, London, he returned to St. Mary's as first assistant pathologist in 1912. His text-book on "The Pathology of Tumours" first appeared in 1916, from which year, until the end of the war, he was attached as a civil surgeon to the 3rd London General Hospital. In 1920 he became pathologist to St. Mary's Hospital, and in 1924 went to Cardiff as professor of pathology and bacteriology in the University of Wales. While at St. Mary's he began the studies of infection and immunity which have led to the experimental researches on silicosis and other industrial diseases on which he is now especially engaged. His earlier published work is chiefly concerned with cancer and splenomegaly. Prof. Kettle has been examiner in pathology in the Universities of London, Cambridge, and Wales, and is at present examiner at Bristol and Glasgow. He was elected F.R.C.P. Lond. in 1931.

Dr. S. P. Bedson was appointed university professor of bacteriology (Goldsmiths' Company) at London Hospital medical college in succession to Prof. William Bulloch, who retires on Oct. 1st.

Dr. Bedson, who was born in 1886, has been senior Freedom research fellow at the London Hospital for the past eight years. Educated at Abbotsholme School and the University of Durham, he graduated in science in 1907 and in medicine in 1912. After post-graduate training at the Pasteur Institute he worked at the Lister Institute in London as British Medical research fellow in the year before the war. From August, 1914, to March 1916, he held a commission in the Northumberland Fusileers, and was wounded at Gallipoli. On transference to the Royal Army Medical Corps he was put in charge of bacteriological laboratories, and early in 1919 became assistant advisor in pathology to the Fifth Army. After two years in the bacteriological department of the Durham University College of Medicine he was appointed assistant bacteriologist to the Lister Institute in 1921, and was later seconded for work on foot-and-mouth disease. His research work has been principally on the blood-platelets and purpura and on filtrable viruses.

Dr. A. B. Appleton, fellow of Downing College and university lecturer in anatomy at Cambridge, was appointed to the university chair of anatomy at St. Thomas's Hospital, in succession to Prof. W. E. Le Gros Clark, as from Sept. 1st.

Dr. Appleton entered Downing College in 1907, and in the following year was elected a foundation scholar. He gained an entrance scholarship at St. Bartholomew's Hospital in 1911, having taken first classes in both parts of the natural sciences tripos. On qualifying in 1914 he was appointed a demonstrator of anatomy in Cambridge, but in October of that year went to France on active service with a commission in the Royal Army Medical Corps. After serving in Malta, Macedonia, and again in France, he resigned his commission in 1919 and was appointed senior demonstrator of anatomy at Cambridge: he was appointed lecturer in 1926. He was awarded the Raymond Horton-Smith Prize for his M.D. thesis in 1922 and the Symington prize of the Anatomical Society in 1923. His research work has been chiefly on the muscular system and the development and growth of bone.

The title of emeritus professor of bacteriology was conferred on Dr. William Bulloch, F.R.S., on his retirement from the Goldsmiths' Company's chair of bacteriology at the London Hospital, and that of emeritus professor of ethnology on Dr. C. G. Seligman, F.R.S., on his retirement from the university chair of ethnology at the London School of Economics.

The date of the appointment of Prof. Karl Pearson as Heath Clark lecturer was changed from 1934 to 1935, and Dr. L. W. Hackett, assistant director of the international health division of the Rockefeller Foundation, was appointed for the year 1934.

Society of Apothecaries of London

At recent examinations the following candidates were successful:—

Surgery.—R. M. Outfin, Guy's Hosp. and Univ. of Bristol.

Medicine.—G. A. Bell, Guy's Hosp.; G. W. Bender, St. Mary's Hosp.; P. E. Cresswell, Univ. of Oxford and Guy's Hosp.; C. McK. Johnston, King's Coll. Hosp.; S. Klein, Univ. of Vienna and St. Mary's Hosp.; and A. Lassman, Univ. of Manch.

Forensic Medicine.—G. W. Bender, St. Mary's Hosp.; P. E. Cresswell, Univ. of Oxford and Guy's Hosp.; C. McK. Johnston, King's Coll. Hosp.; and S. Kay, Univ. of Toronto.

Midwifery.—W. C. Campbell, Univ. of Birm.; W. McC. Graves Morris, Guy's Hosp.; H. W. John, St. Mary's Hosp.; S. Kay, Univ. of Toronto; and G. F. Metcalf, Univ. of Leeds.

Having completed the final examination, S. Kay and G. F. Metcalf have been granted the diploma of the society entitling them to practise medicine, surgery, and midwifery.

University of Leeds

Mr. E. R. Flint has been elected to the chair of clinical surgery in the university.

Mr. Flint qualified in 1905 and graduated at Leeds University in the following year, proceeding to the Fellowship of the Royal College of Surgeons of England in 1912. He held resident appointments at the Leeds General Infirmary and elsewhere, and before joining the honorary staff was surgical tutor at the Infirmary. He delivered Arris and Gale lectures before the Royal College of Surgeons of England in 1923 and 1930—his subjects being abnormalities of the hepatic and cystic arteries and bile-ducts and the association between gall-bladder lesions and hepatitis—and a Hunterian lecture on preoperative procedure appeared in our columns last year. Mr. Flint is surgeon to the General Infirmary at Leeds and for some years has acted as honorary demonstrator of physiology at the Leeds School of Medicine. On his new appointment he will retain his position as director of surgical research.

University of Glasgow

On June 20th the honorary degree of LL.D. was conferred on Prof. René Leriche of the faculty of medicine of Lyons. The following ordinary degrees were also conferred :—

D.Sc.—William James Hamilton, M.B., and Thomas Nicol, M.B.

M.D. (with honours).—D. Baird and J. M. Johnston ; (*with* [illegible] ain, W. Blyth, [illegible]

The history of medicine prize has been awarded to Dr. W. J. Rutherford.

Dr. Archibald Harrington has been appointed to the Muirhead chair of medicine in succession to Prof. W. K. Hunter, who is to retire on September 30th.

Dr. Harrington graduated in medicine at the University of Glasgow in 1900 and became M.D. in 1903. After holding numerous junior appointments at general and special hospitals in Glasgow, he was appointed assistant physician, and later physician, to the Glasgow Fever Hospital, Ruchill. He also served on the honorary staff of the Bellahouston Hospital. Elected F.R.F.P.S. in 1912, he is at present visiting physician to the Royal Infirmary and lecturer and examiner in clinical medicine in the university. His published work deals with a large variety of medical problems.

Epsom College

Lord Leverhulme, the new president, took the chair at the 81st annual general meeting of the governors of the college, which was held at the office, 49, Bedford-square, W.C.1, on June 22nd. In presenting the council's annual report he emphasised the importance of the appeal for new governors in order to enlarge the activities of the foundation. He pointed out that possibly no profession felt the effects of a period of depression more acutely than the medical profession, whose voluntary work in such times was as much increased as their private practice was diminished. It was all the more necessary, therefore, to help as many as possible of the large and ever-growing number of applicants for pensionerships and foundation scholarships. This year the list of successful foundationers contains the names of boys whose fathers practised in Glasgow, Stepney, Shropshire, Peterborough, London, Sierra Leone, and the military and naval medical services. A list of the successful candidates appeared in our last issue.

Medical Reunion in Vienna

The dates of this reunion, which was announced in our issue of June 9th (p. 1264), have been changed, and it will now be held from July 29th to August 4th.

Fellowship of Medicine and Post-Graduate Medical Association

Dr. Clark-Kennedy will give a lecture-demonstration on High Blood Pressure at the rooms of the Medical Society of London, Chandos-street, Cavendish-square, on Tuesday, July 10th, at 2.30 p.m. A week-end course in general medicine and surgery will be given at the General Hospital, Southend-on-Sea, on Saturday and Sunday, July 7th and 8th. There will be a course in dermatology at the Blackfriars Skin Hospital from July 9th to 21st, and a course in urology at the All Saints' Hospital from July 9th to 28th. Dr. Peter Kerley will give three X ray demonstrations for M.R.C.P. candidates at the rooms of the Medical Society of London at 8.30 p.m. on Monday, July 2nd, Wednesday, July 4th and Friday, July 6th. On Saturday, July 14th, Dr. W. J. O'Donovan will give a demonstration of dermatological cases at 3 p.m. at the National Temperance Hospital. Further particulars may be had from the secretary of the Fellowship, Wimpole-street, London, W.1.

Royal Medico-Psychological Association

The ninety-third annual meeting of this association will be held from July 4th to 6th at the Guildhall, Northampton, under the presidency of Dr. D. F. Rambaut, superintendent of St. Andrew's Hospital, Northampton, who will deliver a presidential address entitled Some Mental Treatments. Other speakers will include Mrs. Eleanor C. Slagle, director of occupational therapy in the New York State department of mental hygiene (occupational therapy) ; Dr. Henry Yellowlees (modern psychiatry and mental hospitals); Dr. Rolf Ström-Olsen (results of treatment by prolonged narcosis) ; and Dr. D. C. L. Paddle (lumbar puncture and the cerebro-spinal fluid in 2000 mental defective cases). The secretary of the association is Dr. R. Worth, Springfield Mental Hospital, near Tooting, London, S.W.17.

Training of Nurses: Committee of Inquiry in Scotland

The Secretary of State for Scotland has appointed a committee "to enquire into the training and system of registration of nurses in Scotland and to recommend what amendments, if any, should be made in the Nurses Registration (Scotland) Act, 1919, or the rules made thereunder, and what other steps, if any, should be taken to improve the existing system of training and registration." The members of the committee are : Sheriff A. Campbell Black, K.C. (chairman) ; Dr. W. L. Burgess, medical officer of health, Dundee ; The Lady Susan Gilmour Queen's Institute of District Nursing ; Dr. Mary R. Knight, medical superintendent, Paisley District Asylum ; Mr. T. B. M. Lamb, Scottish Education Department ; Sir Henry Mechan, Western Infirmary, Glasgow ; Dr. John Reid, medical superintendent, County Hospital, Motherwell ; Miss Elizabeth D. Smaill, matron, Edinburgh Royal Infirmary ; Miss Christina Whyte, matron, Robroyston Hospital, Glasgow ; and Dr. John Young, Falkirk and District Royal Infirmary. The secretary of the committee is Mr. W. T. Mercer, of the Department of Health for Scotland, 121a, Princes-street, Edinburgh, to whom all communications should be addressed.

Silicosis and Asbestosis

The Home Secretary has given notice that he proposes to amend paragraph 12 of the Silicosis and Asbestosis (Medical Arrangements) Scheme, 1931, which provides for the initial medical examination of workmen newly engaged for employment in certain occupations. Copies of the draft amending scheme may be had on application to the Industrial Division, Home Office, Whitehall, London, S.W.1.

Oxford Ophthalmological Congress

This congress meets at Keble College, Oxford, on the evening of next Wednesday, July 4th, and on the following morning after a welcome by the Master, Mr. Cyril Walker, there will be a symposium on functional diseases of the eye, the speakers including Sir Farquhar Buzzard, Mr. F. Williamson-Noble, and Dr. William Brown. Mr. R. Affleck Greeves will report a case of retinal glioma treated by radium externally. In the afternoon Dr. H. W. Barber is to give an address on the ætiology and treatment of some conditions affecting the eyelids, and there will be a number of demonstrations ; in the evening the annual dinner will be held in Keble College. On the morning of Friday Dr. Thomson Henderson will speak on the constitutional factor in myopia, and Mr. Arnold Sorsby on the pre-myopic state, and Prof. Joseph Meller, of Vienna, will deliver the Doyne memorial lecture on tuberculosis and its relation to spontaneous post-traumatic and sympathetic ophthalmia. Communications in the afternoon include papers on the influence of diet in ophthalmic practice (Dr. Oliver Pratt), thermoplasty of the extra-ocular muscles (Mr. Bernard Chavasse), and the ætiology and treatment of congestive glaucoma (Mr. J. Jameson Evans and Mr. P. Jameson Evans [illegible] Saturday morning Mr. F. Ridley will speak on the clinical significance of the composition of the tears, and Mr. L. H. Savin on uveoparotid fever. The address of the hon. secretary, Mr. C. G. Russ Wood, is Hill House, Abberbury-road, Iffley, Oxford.

Medical Diary

formation to be included in this column should reach us roper form on Tuesday, and cannot appear if it reaches ater than the first post on Wednesday morning.

SOCIETIES

YAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.
TUESDAY, July 3rd.
Annual General Meeting of the Society. 5 P.M.
FRIDAY.
Obstetrics and [illegible] Discussion in conjunction [illegible] y on Sex: Its Nature [illegible] from Biological and Legal Points of View. To be opened by Prof. F. A. E. Crew, Dr. H. Gardiner-Hill, Sir Bernard Spilsbury, and Lord Riddell. Members of the Section of Medicine are specially invited.

ICO-LEGAL SOCIETY.
See under ROYAL SOCIETY OF MEDICINE.

TH-WEST LONDON POST-GRADUATE ASSOCIATION.
WEDNESDAY, July 4th.—Visit to the Heritage Schools, Chailey, Sussex. Mrs. C. W. Kimmins.

FORD OPHTHALMOLOGICAL CONGRESS.
THURSDAY, July 5th, to SATURDAY.—Annual Meeting at Oxford.

YAL MEDICO-PSYCHOLOGICAL ASSOCIATION.
WEDNESDAY, July 4th, to FRIDAY.—Annual Meeting at Northampton.

ECTURES, ADDRESSES, DEMONSTRATIONS, &c.

LLOWSHIP OF MEDICINE AND POST-GRADUATE EDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY, July 2nd, to SUNDAY, July 8th.—PRINCE OF WALES'S HOSPITAL, Tottenham, N. All-day Course in Medicine, Surgery, and the Specialties.—NATIONAL HOSPITAL FOR DISEASES OF THE HEART, Westmoreland-street, W. All-day Course in Cardiology (open to non-members).—CHILDREN'S CLINIC, Cosway-street, Marylebone-road, N.W. Course in Children's Diseases.—GENERAL HOSPITAL, SOUTHEND-ON-SEA. Week-end Course in Medicine and Surgery. All day, Sat. and Sund.—MEDICAL SOCIETY OF LONDON, Chandos-street, W. Demonstrations of X Rays by Dr. Peter Kerley, at 8.30 P.M. on Mond., Wed., and Frid. (Specially suitable for M.R.C.P. candidates.)—PANEL OF TEACHERS. Individual clinics in various branches of medicine and surgery are available daily.—Courses of instruction, clinics, &c., arranged by the Fellowship of Medicine are open only to Members and Associates unless otherwise stated.

IVERSITY OF BIRMINGHAM.
TUESDAY, July 3rd.—3.30 to 5 P.M. (at the Children's Hospital), Dr. J. M. Smellie: Pulmonary Fibrosis and Allied States.
FRIDAY.—3.30 to 5 P.M. (at the Queen's Hospital), Mr. R. K. Debenham: Minor Operative Procedures.

Vacancies

For further information refer to he advertisement columns

berdeen, P.H. Dept.—Asst. M.O.H. £600.
berdeen University.—Lecturer in Morbid Anatomy. £400.
ccrington Victoria Hospital.—H.S. £150.
yr County Hospital.—Res. H.S. At rate of £125.
angor, Caernarvonshire and Anglesey Infirmary.—Jun. H.S. At rate of £100.
th, Royal United Hospital.—H.S. and Out-patient and Cas. O. Each at rate of £150.
irkenham C.B.—Res. Asst. M.O. £350.
irmingham and Midland Eye Hospital.—Third H.S. At rate of £100.
ambridge, Addenbrooke's Hospital.—H.S. At rate of £130.
ambridge, Addenbrooke's Hospital.—Res. Anæsthetist and Emergency Officer. At rate of £130.
hester, Barrowmore Hall, Great Barrow.—H.P. At rate of £100.
esterfield and North Derbyshire Royal Hospital.—H.S. At rate of £150.
lchester, Essex County Hospital.—H.P. £150.
nnaught Hospital, Walthamstow, E.—H.S. At rate of £100.
genham Urban District Council.—M.O.H. £900.
rizes, Wilts County Mental Hospital.—Med. Supt. £900.
rham County Hospital.—Two H.S.'s. Each £150.
Ham Memorial Hospital, Shrewsbury-road, E.—Hon. Ophth. Surgeon.
Ham and Southend-on-Sea Mental Hospital.—Med. Supt. £900.
inburgh Corporation, Venereal Diseases Scheme.—Clin. M.O. £750.
olkestone Royal Victoria Hospital.—Sen. and Jun. Res. M.O.'s. At rate of £150 and £120 respectively.
oucester, Gloucestershire Royal Infirmary, &c.—H.P. and H.S. Each at rate of £150.
imsby and District Hospital.—Sen. and Jun. H.S.'s. £200 and £150 respectively.
ildford, Royal Surrey County Hospital.—H.S. £150.
ampshire County Council.—Asst. County M.O. £600.
ospital for Consumption and Diseases of the Chest, Brompton, S.W.—H.P. At rate of £50.
ospital Français, 172, Shaftesbury-avenue, W.C.—Physician to In-patients. Also Otolaryngologist for Out-patient Dept.
Hospital of St. John and St. Elizabeth, 60, Grove End-road, N.W. Res. H.P. At rate of £100.
Hospital for Sick Children, Great Ormond-street, W.C.—Three Out-patient Surgical Registrarships. Each £200.
Huddersfield Royal Infirmary.—2 H.S.'s. Each at rate of £150.
Hull Royal Infirmary.—Cas. O. At rate of £150.
Hull Royal Infirmary.—Third H.S. At rate of £150.
Indian Medical Service.—Commissions.
King Edward Memorial Hospital, Ealing.—Jun. Res. M.O. At rate of £150.
Leamington Spa, Warneford General Hospital.—Res. H.S. to Cas. and Special Depts. At rate of £150.
Leicester, Leicestershire and Rutland Mental Hospital, Narborough. Sen. Asst. M.O. £550.
Lincoln County Hospital.—Jun. H.S. At rate of £150.
Llanelly and District Hospital.—H.S. £150.
London Hospital, E.—Hon. Asst. Anæsthetist.
London Homœopathic Hospital, Great Ormond-street, W.C.—Res. M.O. £100.
London Lock Hospital, 91, Dean-street, W.—Surg. Reg. £100.
Manchester, Ancoats Hospital.—H.S. to Special Depts. At rate of £100.
Manchester, Booth Hall Hospital for Children.—Dept. Med. Supt. £550. Res. Surg. O. Also Jun. Asst. M.O.
Manchester, Christie Hospital and Holt Radium Institute.—Radiological Asst. M.O. £450.
Manchester, Crumpsall Hospital &c.—Deputy Med. Supt. £600. Res. Surg. O. £400. Res. Obstet. O. At rate of £300. Also Two Jun. Asst. M.O.'s. Each at rate of £200.
Manchester Royal Children's Hospital.—Res. M.O. At rate of £125.
Manchester Royal Eye Hospital.—Jun. H.S. £120.
Manchester, St. Mary's Hospital.—Three H.S.'s to Special Depts. Each at rate of £50.
Manchester, Withington Hospital, &c.—Deputy Med. Supt. £600. Res. Surg. O. £400. Also Three Jun. Asst. M.O.'s. Each at rate of £200.
Mansfield, Harlow Wood Orthopædic Hospital.—Two H.S.'s. Each at rate of £175.
Margaret-street Hospital for Consumption and Diseases of the Chest, W.—Hon. Asst. Phys. and Hon. Asst. Radiologist.
Middlesex C.C.—Dist. M.O.'s and Public Vaccinators. £50 and £100.
Mildmay Mission Hospital, Austin-street, Bethnal Green, E.—Asst. Cas. O. Also Jun. Res. M.O. At rate of £125 and £100 respectively.
Miller General Hospital, Greenwich-road, S.E.—Cas. O. At rate of £150.
National Temperance Hospital, Hampstead, N.W.—Hon. Asst. Surgeon.
Newcastle-upon-Tyne, Hospital for Sick Children.—H.P. and H.S. At rate of £100.
Newcastle-upon-Tyne Hospital for Sick Children.—Res. Surg. O. £250.
New Zealand, Wellington Hospital Board.—Res. Surg. O. £400.
Northampton General Hospital.—H.S. to Ear, Nose and Throat Dept. At rate of £150.
Plymouth, S. Devon and E. Cornwall Hospital.—Res. Anæsthetist and H.S. to Spec. Depts. At rate of £120.
Prince of Wales's General Hospital, W.—Hon. Physician to Children's Dept.
Princess Elizabeth of York Hospital for Children, Shadwell, E.—Dermatologist.
[illegible] næsthetist. £150.
[illegible] *Portland-street, W.*—
[illegible] te of £150.
[illegible] to X Ray Diagnostic Dept.
St. John's Hospital, Lewisham, S.E.—H.P. and Cas. O. Each at rate of £100.
Salisbury General Infirmary.—H.S. and H.P. Cas. O. Each at rate of £125.
Scarborough Hospital and Dispensary.—H.S. At rate of £175.
Sheffield Children's Hospital.—H.S. Also H.P. Each at rate of £100.
Sheffield Royal Infirmary.—M.O. to Assist Medical Director at Sheffield Radium Centre.
Sheffield Royal Infirmary.—Ophth. H.S. At rate of £80–£100.
Shoreham-by-Sea, Southlands Hospital.—Asst. M.O. Temporary Asst. M.O. £350.
Southampton, Royal South Hants and Southampton Hospital.—Cas. O. At rate of £150.
Southend-on-Sea General Hospital.—H.S. At rate of £100.
Southern Rhodesia Medical Service.—Government M.O. £600.
Stockport Infirmary.—H.S. £150.
Taunton and Somerset Hospital.—H.P. At rate of £100.
Weir Hospital, Grove-road, Balham, S.W.—Jun. Res. M.O. £150.
Western Ophthalmic Hospital, Marylebone-road, N.W.—Hon. Asst. Surgeon.
Willesden General Hospital, Harlesden-road, N.W.—Hon. Phys. to Skin Dept.
Witham, Essex, Royal Eastern Counties Institution.—Med. Supt. £600.
Wolverhampton Royal Hospital.—H.P. At rate of £125. Also Asst. Res. M.O. and H.S. to Spec. Depts. Each at rate of £100.
Worcester Royal Infirmary.—H.P. £160.

The Chief Inspector of Factories announces vacant appointments for Certifying Factory Surgeons at Liverpool, Garston, Lancs.; and at Mullion, Cornwall.

NEW WING OF KING GEORGE HOSPITAL, ILFORD. On Saturday last the foundation-stone of a new wing was laid by Mr. Henry T. Becker, who has given £25,000 towards the cost. The wing will accommodate 58 patients.

NOTES, COMMENTS, AND ABSTRACTS

JOINT LUBRICATION

BY ERIC SHIRLEY JONES, M.R.C.S. Eng.

AN animal joint and a machine bearing have this in common: each consists of two accurately opposed solid surfaces separated by a film of fluid lubricant. The importance which the engineer attributes to this film is well known. He recognises two separate states of lubrication[1]:

(*a*) *Fluid film or "perfect" lubrication*, in which a film of liquid lubricant one or two thousandths of an inch thick separates the solid surfaces. In this state friction is independent of load, and is only dependent on the viscosity, or resistance to shear, of the oil film. This is the state of lubrication aimed at by all machine designers, and is the state which almost certainly obtains in a healthy joint working under favourable circumstances.

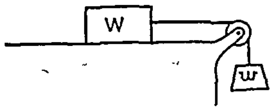

FIG. 1.—Measurement of coefficient of friction for two plane surfaces.

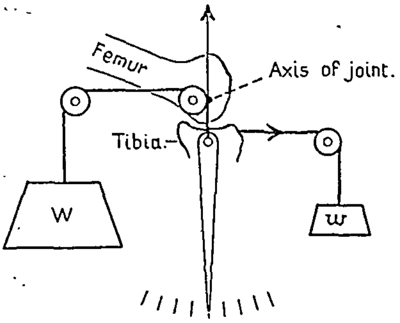

FIG. 2.—Measurement of coefficient of friction of a joint.

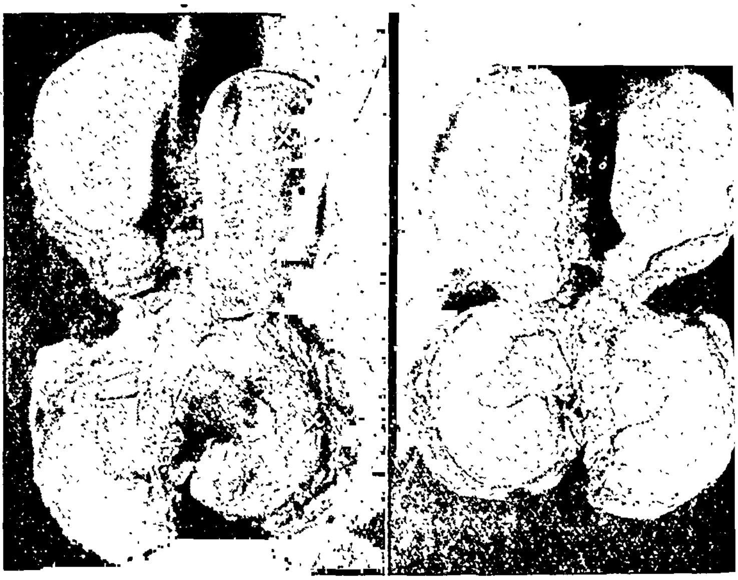

FIG. 3.—Test joint (left of Figure) and control joint (right). The test joint sho signs of wear over the areas marked x.

(*b*) *Boundary layer lubrication.*—The molecules of oil in contact with a metal surface become "adsorbed" to the metal and act, no longer as a liquid, but as a greasy solid. The state of affairs when two such layers are in contact is called "boundary layer" lubrication. In this state friction is proportional to load, and follows the ordinary laws governing solid friction. The viscosity (resistance to change of shape) of the oil no longer counts, but another property called "oiliness" becomes the dominant factor in friction reduction.

The engineer recognises this state as an unavoidable evil, which will occur under conditions of heavy load, low speed, or at stopping and starting. It is probable that this state also occurs in joints. The cracking of joints on being moved after rest is difficult to explain unless we assume an absence of the fluid film.

The essential characteristics for a fluid lubricant appear to be three:

1. It must wet the surfaces to be lubricated.
2. It must possess viscosity to prevent its being squeezed out under load.
3. It must possess "oiliness" to prevent friction when boundary layer conditions occur.

Synovial fluid obviously satisfies the first condition. In the following results (Table I.) viscosity has been measured by the Hess viscometer. This instrument consists of two parallel capillaries, along which w and the fluid to be measured are simultaneo aspirated. The result is expressed in times viscosity of water. Forkner[2] has found viscos of synovial fluid to range from 2·91 to 4·79 in hea and from 2·7 to 16·7 in chronic arthritis. Pembert agrees with these figures, and some of the appen results are in fair agreement. Kling[4] has shown the viscosity of synovial fluid is due to its mu and that, when this is removed, the viscosity d to that of a simple exudate.

My attempts to measure "oiliness" of synovial under "boundary layer" conditions have so far fai although surfaces of glass, ebonite, wood, cast i rubber, and articular cartilage have all been tried.

THE COEFFICIENT OF STATIC FRICTION FOR TW PLANE SURFACES

When the small weight (w) is just large enoug cause the large weight (W) to move, the coeffic of static friction $\mu = w/W$. (Fig. 1.) This fractio independent of the load W, and depends only on character of the surfaces.

Since a joint has curved surfaces it is essential t the resultant of the load (W) shall pass through axis of the joint. Otherwise the load will ca movement and vitiate the result. To satisfy th conditions, a horse's stifle joint was set up in a fra so that the femur was fixed and the tibia free move. (Fig. 2.) Through the tibia was passed a st pin, and cords from this were passed over pulleys the loads (W). These pulleys were on an adjusta carriage, and this was adjusted until the tibia wo remain in any position through a small arc, show that the resultant of the weights (W) passed through axis of the joint. Capsule and ligaments were sever and the measurement was taken working downward, prevent a sticking tendency that otherwise develop

	w/W	= μ (coefficient of frictio
With synovial fluid ..	$\frac{10}{448}$ ounces	= 0·02.
With normal saline ..	$\frac{9}{448}$,,	= 0·02.
Surfaces allowed to dry	$\frac{122}{448}$,,	= 0·27.

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